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CONTENTS

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JOURNAL

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H. Preston Hoskins, Secretary-Editor, 716 Book Building, Detroit, Mich.

Vol. LXIX, N. S. Vol. 22 June, 1926 No. 3

STATE ASSOCIATION MEETINGS

During the past six months, we have received and published reports of the meetings of most of the state veterinary associations which met during the winter months. Judging from these reports, as well as our own personal observations made at the half-dozen meetings we attended, it would appear that conditions generally are much improved over recent years. Several of the associations reported the most successful meetings ever held.

This opportunity is taken to thank the various secretaries who have prepared and forwarded the splendid reports of these meetings which have appeared in the JOURNAL, during recent months. These reports are valuable in a number of ways, not the least of which is for the reason that veterinarians are afforded an opportunity, by reading these reports, to know just how veterinary affairs are going in different parts of the country.

It is interesting to study and compare these reports, to see just what are the important problems in other states. For example, in his report of the Iowa meeting, published in the May issue of the JOURNAL, Secretary Steel related how the practitioners have taken hold of tuberculosis eradication in Iowa. In addition to constituting a sort of running history of current

events, these reports enable secretaries of the different associations to study the character of the programs of the meetings of other associations. Many a valuable suggestion has been obtained through the publication and study of these reports.

Every once in a while we receive a letter from a veterinarian and, among other things, he will mention the fact that he has not seen any reports of the meetings of his own state association for some time. Almost invariably we are under the necessity of replying to the effect that no report has been received. We practically never attempt to formulate a report ourselves, based upon nothing more than a copy of the program which may have been forwarded to us. It is only upon rare occasions that all of the papers listed on a program actually materialize and very few programs are followed as printed.

Certain features have apparently contributed in no small degree to the success of some of the meetings recently held. For the first time, the Ohio State Veterinary Medical Association invited the ladies this year. Of the 300 veterinarians in attendance 70 were accomapnied by their wives and a number of those in attendance have said that it was their opinion that this feature was responsible, more than any thing else, for the splendid success of the meeting. We are advised that 55 new members were admitted and 10 former members were reinstated on the roll of the Association, which, in itself, is a very encouraging symptom.

Dr. C. P. Fitch, secretary of the Minnesota State Veterinary Medical Association, reported an attendance of 235 veterinarians at the winter meeting, although the number of members on the roll of the Association was only 229. The attendance reported is approximately 60 per cent of the graduate veterinarians in Minnesota. The practitioners of the Gopher State are to be congratulated upon the splendid showing they made in contributing to the program. There is no one difficulty more uniformly reported by association secretaries than that of getting men in practice to participate in the program. Every once in a while we see a program in which practically all of the papers are being contributed by veterinarians engaged in control work, teaching, laboratory investigation, or commercial lines, with practically no papers contributed by practitioners. This is not a good sign.

During recent years, many associations have studied the question of the proper number of meetings to be held during

the year, the most favorable times and even the form which their meetings should take. In this connection, we believe that the ideal arrangement is to have one regular meeting of the association each year and one other gathering, which may or may not necessarily be a meeting of the state association, but more along the lines of the so-called "short course." Substantially this system is now being followed in a number of states and it seems to be working out very nicely. The annual meeting of the state association may be held during the winter and the so-called "short course" during the summer, or vice versa.

Another thing that should be taken into consideration by the officers of the different associations is the desirability of coordinating meeting dates, so as to avoid conflicts as much as possible and with the idea of having meetings in a given section of the country come in such a sequence that they will enable contributors to the programs to go from one meeting to another without undue loss of time, extra travel and expense. By cooperating in this way, several associations will find it possible to secure for their programs veterinarians of national prominence who would be willing to make a rather long trip, if it would be possible to attend three or four meetings on the same trip. This is particularly true of the officers of the national organization, who probably receive more such invitations than anybody else.

The publication of the reports of the meetings of veterinary associations has always been a feature of the JOURNAL, as well as its predecessor, the *American Veterinary Review*. It is our intention to continue this feature and we are asking for a continuance of the splendid cooperation and support of the officers of these associations, such as we have received in the past. The calendar of "Coming Veterinary Meetings," published each month, has been commented upon very favorably on several occasions. We should receive notices of such meetings just as far in advance as possible.

FOOT-AND-MOUTH DISEASE IN MEXICO

Effective May 7, an order issued by the United States Department of Agriculture established quarantine regulations to prevent the introduction of foot-and-mouth disease, into the United States, from Mexico where that live stock scourge has recently been discovered for the first time.

Since the disease is in the southern portion of Mexico, the menace is still at a considerable distance and the regulations are

purely of a precautionary nature. They prohibit the importation, into the United States, of cattle, sheep, goats, other ruminants and swine; also of hides, skins, other animal by-products, hay, straw and feeding material, originating in the portion of Mexico south and east of the Tehuantepec National Railway, which crosses the isthmus of Tehuantepec. The quarantine order applies also to the same classes of animals and products shipped through such area, or unloaded in it.

EXECUTIVE BOARD ELECTION

The election of a member of the Executive Board, now in progress in District No. 6, is proving to be one of the most hotly contested elections ever held. Early in the month there was a time when less than a dozen votes separated first and fifth places in the standing. An extraordinary amount of interest seems to have been created in several states in the District. This is a healthy sign. We are glad to see it. There are still quite a few ballots out, however, and we hope that those members who have not yet exercised their privilege will do so. The polls will remain open until June 17, and the result of the election will be announced in the July issue of the JOURNAL.

APPLICATIONS FOR MEMBERSHIP

(See April, 1926, JOURNAL)

FIRST LISTING

BACON, ERNEST V. Estelline, So. Dak.
D. V. M., Kansas City Veterinary College, 1913
Vouchers: C. C. Lipp and J. B. Taylor.

CARTER, EMERT STEWART 511 W. McDaniel St., Springfield, Mo.
D. V. M., Kansas City Veterinary College, 1914
Vouchers: Robert J. Foster and A. T. Kinsley.

CLARK, EDWARD P. Intercourse, Pa,
V. M. D., University of Pennsylvania, 1914
Vouchers: H. W. Barnard and Frank U. Fernsler.

DAILEY, HUGH FREDERICK 184 Longwood Ave., Boston, Mass.
V. M. D., University of Pennsylvania, 1913
Vouchers: E. F. Schroeder and Rudolph H. Schneider.

FINCKE, GERALD PAYNE 250 Moreland Ave., Hatboro, Pa.
V. M. D., University of Pennsylvania, 1925
Vouchers: C. J. Marshall and G. A. Dick.

FRIDIRICI, IRA LINTON Independence St., Orwigsburg, Pa.
V. M. D., University of Pennsylvania, 1916
Vouchers: C. J. Marshall and G. A. Dick.

GILLMANN, JOHN H. 219 Madison Ave., Memphis, Tenn.
D. V. M., St. Jsoeph Veterinary College, 1917
Vouchers: G. G. Graham and L. H. Middaugh.

HAASJES, CHARLES H. Shelby, Mich.
D. V. S., Grand Rapids Veterinary College, 1918
Vouchers: B. J. Killham and O. H. Core.

HALL, WARREN P. S. 13581 Pinehurst, Detroit, Mich.
D. V. M., Michigan State College, 1920
Vouchers: H. Preston Hoskins and H. H. Sparhawk.

HENLEY, M. D. Wingate, Ind.
D. V. M., Terre Haute Veterinary College, 1918
Vouchers: C. C. Donelson and R. C. Julien.

IRELAND, JOSEPH W. 1102 Vermont St., Quincy, Ill.
V. S., Ontario Veterinary College, 1885
Vouchers: Robert Graham and A. T. Kinsley.

JOHNSON, A. A. Box 825, Martinsburg, W. Va.
D. V. M., Indiana Veterinary College, 1918
Vouchers: S. E. Hershey and Samuel M. Langford.

KNOBEL, EDWARD 453 Washington St., Dedham, Mass.
M. D. V., Harvard University, 1895
Vouchers: E. A. Crossman and Edward T. Ryan.

KNOWLES, A. T. 2930 Allapattah Drive, Miami, Fla.
D. V. S., Kansas City Veterinary College, 1904
Vouchers: J. H. Yarborough and A. L. Shealy.

MARNEY, U. E. Box 386, San Antonio, Texas.
D. V. M., Kansas City Veterinary College, 1912
Vouchers: M. E. Gleason and N. F. Williams.

PEACE, CHARLES V. 33 So. 5th Ave., Coatesville, Pa.
V. M. D., University of Pennsylvania, 1914
Vouchers: C. J. Marshall and G. A. Dick.

PLEUGER, CARL A. 2129 Freeman Ave., Cincinnati, Ohio.
D. V. M., Ohio State University, 1922
Vouchers: Leonard W. Goss and Russell E. Rebrassier.

RICHARDSON, OSCAR C. 1502 No. Capitol Ave., Indianapolis, Ind.
D. V. M., Ohio State University, 1925
Vouchers: Leonard W. Goss and Frank J. Muecke.

ROBINSON, MURRELL ORTON East Downingtown, Pa.
V. M. D., University of Pennsylvania, 1925
Vouchers: Louis A. Klein and G. A. Dick.

Applications Pending

SECOND LISTING

Amsher, Peter I., 292 Monroe St., New York, N. Y.
Barrett, Lawrence Dean, 715 Arch St., N. S., Pittsburgh, Pa.
Bingham, Alvin Byron, Box 303, Middleport, Ohio.
Castleberry, W. B., 1129 Brown-Marx Bldg., Birmingham, Ala.
Craver, Nevin S., 234 Holmes St., Youngstown, Ohio.
Ellertson, James A., 34 River St., Madison, Ohio.
Frank, Edward R., K. S. A. C., Manhattan, Kans.
Gilbert, Ray D., Gettysburg, Ohio.
Gregory, R. Todd, Box 127, Moundsville, W. Va.
Heiden, Leslie J., 515 So. 10th St., Escanaba, Mich.
Hobbs, Walter Romeo, 1122 Lincoln Road, Columbus, Ohio.
Jackman, John A., 124 So. Washington Ave., Columbus, Ohio.
Jackson, M. F., 1129 Brown-Marx Bldg., Birmingham, Ala.
Jay, Robert, Box 338, Sacramento, Calif.
Lyons, Wm. Francis, R. F. D. No. 4, Coshocton, Ohio.
McCullough, Hugh, Canadian Packing Co., Peterboro, Ont.
Martin, Edward David, 91 West 10th Ave., Columbus, Ohio.
Meredith, Clarence D., 521 Virginia, Joplin, Mo.
Merrick, Byron P., Berlin Heights, Ohio.
Merrick, James R., 245 No. Pleasant St., Oberlin, Ohio.
Nichols, Theodore Earl, 829 E. Whittier St., Columbus, Ohio.
Petteys, Charles E., Weston, Ohio.
Seeley, Milton James, 316 So. Pleasant Ave., Lodi, Calif.
Steenerson, T. L., Wilkinson, Ind.
Wardlow, Alpha Earl, Box 338, Sacramento, Calif.

Watts, Charles C., Pataskala, Ohio.
White, A. B., Box 114, Grove City, Ohio.
Wilhelm, Allen A., 128 E. Tiffin St., Fostoria, Ohio.

REINSTATED

Kelly, J. J., Marshall, Minn.
Shuford, E. L., Jr., Box 1295, Asheville, N. C.

The amount that should accompany an application filed this month is $7.91, which covers membership fee and dues to January 1, 1927, including subscription to the JOURNAL.

COMING VETERINARY MEETINGS

Texas State Veterinary Medical Association. Short Course for Veterinarians. A. & M. College of Texas, College Station, Tex. June 14-15-16-17-18-19, 1926. Dr. D. Pearce, Secretary, Leonard, Tex.

Kansas City Association of Veterinarians. New Baltimore Hotel, Kansas City, Mo. June 15, 1926. Dr. J. D. Ray, Secretary, 400 New Centre Bldg., Kansas City, Mo.

Northeastern Indiana Veterinary Medical Association. Columbia City, Ind. June 16, 1926. Dr. O. E. Blackburn, Secretary, Harlan, Ind.

Indiana-Illinois Veterinary Medical Association. Merom, Ind. June 18, 1926. Dr. M. W. Scott, Secretary, Vincennes, Ind.

Michigan State Veterinary Medical Association. Michigan State College, East Lansing, Mich. June 22-23-24, 1926. Dr. E. K. Sales, Secretary, 535 Forest St., East Lansing, Mich.

Eastern States Tuberculosis Eradication Conference. Burlington, Vt. June 22-23, 1926.

Vermont Veterinary Medical Association. Burlington, Vt. June 22-23, 1926. Dr. Geo. Thomas, Secretary, Bradford, Vt.

Keystone Veterinary Medical Association. Philadelphia, Pa. June 23, 1926. Dr. C. S. Rockwell, Secretary, 5128 Chestnut St., Philadelphia, Pa.

North Carolina State Veterinary Medical Association. Raleigh, N. C. June 23-24, 1926. Dr. W. A. Hornaday, Secretary, Greensboro, N. C.

California State Veterinary Medical Association. Los Angeles, Calif. June 28-29-30, 1926. Dr. E. H. Barger, Secretary, University Farm, Davis, Calif.

New York State Veterinary Medical Society. Cortland, N. Y. June 29-30, 1926. Dr. C. E. Hayden, Secretary, 110 Irving Place, Ithaca, N. Y.

Massachusetts Veterinary Association. American House, Boston, Mass. June 30, 1926. Dr. H. W. Jakeman, Secretary, 44 Bromfield St., Boston, Mass.

Illmo Veterinary Medical Association. Country Club, Marissa, Ill. July 1, 1926. Dr. L. B. Michael, Secretary, Collinsville, Ill.

New Jersey, Veterinary Medical Association of. Asbury Park, N. J. July 8-9, 1926. Dr. Geo. P. Ellice, Secretary, 37 Ivy Place, Rutherford, N. J.

Virginia State Veterinary Medical Association. Ocean View, Va. July 8-9, 1926. Dr. W. H. Ellett, Secretary, Midlothian, Va.

South Carolina Association of Veterinarians. Orangeburg, S. C. July 13-14, 1926. Dr. M. R. Blackstock, Secretary, Spartanburg, S. C.

Maine Veterinary Medical Association. Rockland, Me. July 14, 1926. Dr. A. J. Neal, Secretary, 324 Essex St., Bangor, Me.

Nevada State Veterinary Association. Reno, Nev. July 14, 1926. Dr. Edward Records, Secretary, University of Nevada, Reno, Nev.

Illinois State Veterinary Medical Association. Springfield,, Ill. July 14-15, 1926. Dr. W. H. Welch, Secretary, Lexington, Ill.

Maryland State Veterinary Medical Association. Hagerstown, Md. July 15-16, 1926. Dr. E. M. Pickens, Secretary, College Park, Md.

North Dakota Veterinary Medical Association. Fargo, N. D. July 20-21, 1926. Dr. H. L. Foust, Secretary, State College, Fargo, N. D.

Missouri Valley Veterinary Association. Kansas City Athletic Club, Kansas City, Mo. July 27-28-29, 1926. Dr. E. R. Steel, Secretary, Grundy Center, Iowa.

Montana Veterinary Medical Association. Helena, Mont. July 30-31, 1926. Dr. Hadleigh Marsh, Secretary, Livestock Sanitary Board, Helena, Mont.

STATE BOARD EXAMINATIONS

Texas State Board of Veterinary Medical Examiners. College Station, Tex. June 14, 1926. Dr. R. G. Flowers, Secretary, 3rd & Main Sts., Fort Worth, Tex.

owa Veterinary Examining Board. State House, Des Moines, Iowa. July 1-2, 1926. Dr. Peter Malcolm, Secretary, Des Moines, Iowa.

linois Veterinary Examining Board. Springfield, Ill. July 19-20, 1926. Superintendent, Board of Registration, Springfield, Ill.

PURE MILK ABSOLUTE NECESSITY FOR CHILDREN*

By HENRY E. UTTER, M. D., *Providence, R. I.*

The relation of bovine tuberculosis to tuberculosis in the human being is an important subject to the practicing physician and health officials throughout the world. The great problem which confronts us is: What proportion of tuberculosis in the human body is produced by the bovine tubercle bacillus? Concerning this we have conflicting opinions, depending largely upon the city or community from which statistics are compiled.

William H. Park, of New York City, states that the bovine type of tuberculosis is common in children under two years of age, is limited to glandular disease in later childhood and in adult life is of negligible importance. Of tuberculous glands examined for the tubercle bacillus, the bovine type was found in 61 per cent, in children under five years of age. Of abdominal tuberculosis he states that 57 per cent of the cases are due to the bovine bacillus. In all cases of tuberculosis in children he states that 10 per cent are due to the bovine type of tubercle bacillus.

A. P. Mitchell, of Edinburgh, Scotland, states that 90 per cent of tuberculous gland disease in that community is due to the bovine tubercle bacillus. Griffith, in a survey of a large number of cases of gland tuberculosis in England, concluded that 72 per cent of tuberculous gland conditions were due to the bovine tubercle bacillus. Thus it will be noted that different localities are infected in varying degrees with bovine tuberculosis.

What then is the relation of the bovine tubercle bacillus to child welfare work in any community? In what way does tuberculosis affect the children?

Bovine tuberculosis affects the child during the period of greatest growth, particularly the first five years. He is handicapped physically and, as a result of his illness during the period of rapid growth, he is likewise placed behind children of his own age mentally. His early childhood is fraught with difficulties, through physical backwardness, incident to his preparation for the more arduous school duties to come later.

These children are pale, undernourished beings. They suffer

*Presented at the sixth annual Eastern States Conference on the Eradication of Tuberculosis in Live Stock, Providence, R. I., June 16-17, 1925.

from lack of appetite and proper assimilation of their food. They are easily exhausted and after the beginning of school life are unable to cope well with the duties imposed upon them or to contend physically with children of their own age. They suffer from chronic invalidism during a period when their physical and mental growth should be ideal.

From the medical viewpoint, tuberculosis in childhood is gland tuberculosis; and particularly under two years of age, tuberculous meningitis is by no means infrequently met with in the practice of a physician whose work is limited to the care of children. The disease is chronic in nature, resistant to treatment, lasts many months or even years and, as the tubercle bacillus is treacherous in its activities, the disease is marked by many exacerbations or recurrences of the underlying condition.

A Study of Tuberculosis in Children

Just what proportion of tuberculosis met with in the physician's routine practice is due to tuberculosis transmitted through milk is hard to decide. For practical discussion I have examined the records of 100 patients with tuberculosis, encountered in private practice, hospital cases not being included. I have further chosen records in which there was a definite statement concerning the possible origin of the disease. In many of our records notes were not made concerning milk supply of patients, nor was there any certainty about possible contact with human tuberculosis. These cases were not included. Of the 100 cases studied, 39 suffered from severe tuberculosis of the lymphatic glands of the neck, 22 from disease of the bronchial glands (that chain of lymphatic glands found at the root of the lungs), 19 from disease of both chains of glands, 10 from abdominal tuberculosis, and 10 had and died of tuberculous meningitis. It is not uncommon to find that children who have tuberculosis of the glands of the neck later have other chains of lymphatic glands affected. For instance, we often find, in the histories of those cases with bronchial gland tuberculosis and disease of the abdominal glands, note of some previous gland enlargement in the neck. The ages of these children varied from 6 months to 10 years, 79 being 6 years or under. There was a history of human contact in 13 of the 100 cases. Of the 10 cases dying with tuberculous meningitis, there were but two whose records showed contact with human tuberculosis.

Reports by medical men vary considerably in regard to the

number of cases of tuberculous meningitis, which are due to the bovine bacillus. One author states that 66 per cent, and another 49 per cent, are due to bovine bacillus. It must be remembered that it is not always an easy matter to obtain a clear record of contact with human tuberculosis. Eighty-six (86) were fed in infancy and childhood on raw cow's milk, 9 were fed on sterilized milk and in 5 the question of sterilization was quite uncertain, and if the milk was sterilized, it was not done continuously. Another interesting fact is that of the nine patients fed on sterilized milk, three gave a definite history of human exposure and three of the five in which sterilization was uncertain came in contact with human tuberculosis. Although it is impossible to state just how many of these little patients contracted tuberculosis from milk, if we accept the figures of Park and Mitchell previously mentioned, it is fair to assume that from 50 to 60 per cent were of bovine origin. Cases of pulmonary tuberculosis are not included, only those types which may be of bovine origin.

As to the incidence of tuberculosis in children, it is difficult to state just what proportion of a physician's patients are infected with tuberculosis. If we were to include those children who reacted positively to tuberculin, without demonstrable tuberculous disease, the number would be high. Dr. Park's figures were taken from a city with a pasteurized milk supply. In a community with relatively few accredited herds, possibly there was a larger percentage.

Tuberculosis Makes Children Subnormal

Children with tuberculosis of the glands of the neck are decidedly below normal. These glands become swollen and many of them break down, with the formation of pus. A discharging sinus remains and may last for months or years with some permanent scar formation and disfigurement of the neck.

Children with tuberculosis of the bronchial glands suffer from irritative cough, low fever and are undernourished and underdeveloped physically. Abdominal tuberculosis in childhood is a serious disease and under two years of age often terminates fatally. Tuberculous meningitis or tuberculosis of the brain is a disease of early childhood and always results in death.

The course of all tuberculosis in children is chronic in nature and, whereas recovery may take place, these children find the fight for health during adolescence a hard one because of their lowered vitality.

As to mortality: Disease of the glands of the neck and of the bronchial glands does not result fatally. Where complications exist in the brain, lungs, peritoneum or intestines, death may result.

What is the influence of these tuberculous children upon the welfare of a community? Being underweight and physically below normal they are in themselves unhappy beings. They are never quite well in their early lives. As a result they mingle poorly with the rest of the child population.

The word tuberculosis unfortunately strikes terror to the hearts of most parents—from the lay standpoint the name tuberculosis means pulmonary tuberculosis or consumption. This means contagion in their minds and as a consequence children with gland tuberculosis are considered sources of danger and immediately shunned. Parents of healthy children, because of this ungrounded fear, dislike to have their children associate with those branded tuberculous. The child in his community becomes a social recluse.

In looking into the future of many of these patients, although we assume that bovine tuberculosis is essentially gland tuberculosis, how can we prove that many of them may not later in life suffer from outbreaks of the early-acquired bovine tuberculosis in more serious forms, and thereby be rendered incapable of filling their normal place in the social welfare of a community?

A Serious Economic Problem

From the point of economics to city and state, many children with manifestations of bovine tuberculosis are to be found in our hospitals and state institutions. Bone tuberculosis, often due to the bovine type, incapacitates a child for three to ten years, and such a case, if a public charge, means an enormous cost over such a long period. Tuberculous gland abscesses require hospital care. Abdominal tuberculosis in the early stage needs hospital care and later may require months of treatment in our fresh-air houses.

As many children afflicted with tuberculosis continue with their disease into the school age, many of them must receive their early education while still on a hospital bed or in a fresh-air institution, necessitating the employment of special teachers for this work. The cost of the care of the tuberculous has always been considered an important one, without an attempt to separate the cases of bovine and human tuberculosis. If we can wipe

out the sources of bovine tuberculosis, the saving to municipal and state treasuries would probably be enormous.

From a medical viewpoint how may we cope with the problem of the elimination of bovne tuberculosis in our children? To the practicing physician, there are these methods:

First: By the use of certified milk. In using certified milk we are assured of a clean milk supply, free from tuberculosis. We also secure a milk of uniform fat, sugar and protein content. This is quite an essential in the present-day methods of infant-feeding. There are certain disadvantages in using certified milk which must not be overlooked.

The cost of production and the resultant cost to the consumer is the greatest point against certified milk. A relatively small proportion of our infant population at present is fed on certified milk for this reason. It is perhaps easy for us to state that the public should be educated to a point where the value of certified milk is appreciated, but when the family purse is concerned it is not easy to convince the general public of the importance of such a milk. The average consumer of milk is quite ignorant of the danger of tuberculosis or other infections transmitted through milk and unless a family has met with the ravages of bovine tuberculosis, they are not willing to pay the price for certified milk.

Certified vs Pasteurized Milk

Again, another reason for the poor sale of certified milk lies in the fact that physicians gradually have lost the earlier fear of the dangers of pasteurizing milk and do not feel the necessity of using certified milk in the feeding of infants.

Still another disadvantage of the use of certified milk, and one which I consider of vast importance from the viewpoint of one who is interested in the feeding of infants, is that when a family has purchased a high-priced milk for their infant, during the bottle-feeding period, they feel that their duty is done, and then purchase a milk of inferior grade, which may not be tuberculosis-free. In this lies a real danger, for the second and third years of a child's life constitute a period when susceptibility to tuberculosis is still marked. If the public could appreciate the necessity of continuing the use of certified milk through this vulnerable period, the advantage of certified milk would be great. On the other hand, if a family would, after the period of bottle-feeding, change to a pasteurized milk, the danger of tuberculosis would

be eliminated. But here we find a stumbling block in the fact that many children, who have been fed in their infancy on raw certified milk, flatly refuse to drink milk which is altered in taste by pasteurization.

Another remote disadvantage of certified milk lies in the statement of Dr. W. H. Park that of 4800 cows producing certified milk for New York City, in one year 2.8 per cent reacted to tuberculin and in another year 1.8 per cent reacted. It must, however, be admitted that could the general public be convinced of the value of certified milk, our bovine tuberculosis problem would be almost negligible.

Second: The second method of elimination of bovine tuberculosis would be that of pasteurizing the entire milk supply for our children. We hear much of the dangers of pasteurizing milk. It is stated that the important vitamins contained in raw milk are destroyed by pasteurizing. These vitamins are those which are necessary for the prevention of two important nutritional diseases, scurvy and rickets, although by no means is the lack of vitamins the entire cause of rickets, lack of sunshine, with its important ultraviolet rays, and poor hygienic environment being equally important causative agents in this disease of the bones.

Nutritive Value not Seriously Altered by Pasteurization

Throughout this country physicians, who are responsible for the feeding-care of our infants, universally give sterilized or pasteurized milk without fear of the appearance of rickets or scurvy. It is known that in orange-juice or tomato-juice is found the vitamin which may reduce the incidence of rickets. The nutritive value of milk is probably very little altered by pasteurizing. We sometimes hear of rapid gains in weight when an infant is taken off pasteurized milk and placed upon raw milk. I believe these gains in weight are due to the fact that the physician who makes the change probably strikes upon the proper modification of the milk to suit the infant, rather than the change from pasteurized to raw milk.

A disadvantage often stated of pasteurized milk as a food for infants is that the baby may be getting a milk which has lost its nutritive value through its age. This is true to a considerable extent. The use of old pasteurized milk must be guarded against and we must be sure of our pasteurized milk supply. It is further true that pasteurized milk is a good culture medium for the growth of other organisms which may cause intestinal disturb-

ances, if the milk is improperly handled after pasteurizing. I believe, however, that the advantage of pasteurizing far outweighs the disadvantage of such remote possiblities, when the milk is to be used for feeding our infants.

Pasteurization does kill the tubercle bacillus and in this lies its greatest advantage, because it is much easier to prevent or cure nutritional diseases possibly produced by pasteurization than to cure tuberculosis when it appears. The diseases of nutrition are easily the lesser of two evils.

Third: The third method of eliminating tuberculosis is one of vast importance, namely by elimination of the animal which produces tuberculous milk. In this method lies the surest means of the prevention of bovine tuberculosis. By the elimination of the diseased animal we eliminate the bovine bacillus at the source of its supply.

Advantages of Bovine Tuberculosis Eradication

The advantages of this method are, again from the medical viewpoint:

1. Milk from a tuberculosis-free herd, produced without the stringent regulations incident to the production of certified milk, can be sold at a lower cost than certified milk itself, and hence be used by a much greater number of people.

2. That after the early period of bottle-feeding in infancy or the first year we can be assured that a tuberculosis-free milk will be given to the child during its second, third and fourth years of life. While a baby's milk is being modified, that baby comes under the care of a physician or a Baby Welfare Station. During that time the physician is able to recommend a proper milk. At the end of the first year the supervision of the physician is often dispensed with and the milk supply may be changed without the family knowing the quality of the new milk obtained.

3. The physician will have a safe milk which he will feel free to use raw if so desired, or if preferred he may sterilize or pasteurize at home to suit the individual needs of the child placed in his care. He will indeed have a double security in pasteurizing milk which is free from tuberculosis.

Bovine tuberculosis is an ever-present danger to the infants and young children who are to be our future citizens, healthy members of society if free from tuberculosis, or handicapped for many years if we will not eliminate the tuberculosis in our cows. Remove the tubercle bacillus from our milk supply and we re-

lieve the distressing worries of parents whose children suffer from bovine tuberculosis, as well as the worries of the practicing physician to whom these unfortunate patients come for help.

CURIOSITY KILLED A CHICKEN

Curiosity once killed a cat, but according to Dr. Charles Murray, head of the Veterinary Research Department of Iowa State College, at Ames, Iowa, a more modern version of the saying would involve the substitution of the word "chicken" in place of cat.

Recently the gizzard of a valuable hen sent to Dr. Murray for inspection was found to contain a dozen or more phonograph needles. Evidently the hen had been attracted to the needles by their brightness and, mistaking them for some new type of food, had swallowed them.

Dr. Murray says that it is a natural characteristic for chickens to be attracted by bright objects. He says that every year about July 4 several cases of poison due to the chickens picking up pieces of unexploded fireworks are reported. They are attracted by the bright colors of the explosives and are poisoned by the red phosphorus which they contain.

—Princeville, Ill., *Telephone.*

ON THE WAY TO LEXINGTON

Climbing the mountain in Pike County, to the highest point in Kentucky. Note the old road in creek bed.

TUBERCULOSIS AS A LIVE STOCK PROBLEM IN THE MIDDLE WEST

By H. R. SMITH, *Live Stock Commissioner,*

National Live Stock Exchange,

Chicago, Ill.

While tuberculosis is found in every state of the Union, there are certain sections of the country where it is very prevalent, causing great damage. The highest percentage of infection among cattle is found in the eastern states, but among hogs and poultry in the Middle West. The Middle West states are next highest in cattle infection, with the Pacific Coast states nearly as high. The infection is not high with any class of animals in the southern half of the country nor in the range district.

Because of the large number of swine produced in the Middle West and the high degree of infection in both swine and poultry, as compared with the east, it may be said that the greatest damage caused by tuberculosis is in the Middle West group. There are two reasons why hogs produced in the eastern states have less tuberculosis than those in the Middle West: (1) A large amount of milk is sold in liquid form and relatively less is therefore fed to hogs. (2) Hogs contract tuberculosis from poultry, of which there is much less in the East than in the Middle West.

The highest percentage of infection among cattle in the Middle West group of states is being found in a central belt, extending east to west, taking in the southern portions of Michigan, Wisconsin and Minnesota and northern Ohio, Indiana, Illinois and Iowa. The only explanation we have for that situation is the fact that more breeding cattle, particularly those of the dairy type, have been brought into that section from father east. The theory has been advanced that the southern states have less tuberculosis than the North, because of climatic conditions. It is true that once the infection gets started in a herd it spreads faster when the cattle are closely housed, watering from one tank and feeding at large racks, where more or less slobbering on the feed takes place. The spreading is not induced by the climate, but rather by the closer contact.

Presented at the seventh annual Conference for Veterinarians, University of Illinois, Urbana, February 16-17, 1926.

If climate is much of a factor we would expect more tuberculosis in the northern portions of Michigan, Wisconsin and Minnesota. The reverse is true. In many of those northern counties less than one per cent of the cattle are tuberculous, while in the southern counties of those states it ranges from two to ten per cent. It is probably safe to say that the percentage of infection in the southern half of these states is four times as high as in the northern half. So also the percentage of infection in the northern half of Ohio, Indiana, Illinois and Iowa is at least four times as high as in the southern half of those states. The real explanation is that the cattle in those sections where the infection is low are mostly native breeding cattle or feeders imported from the range country.

Feeder Cattle A Small Factor

The state of Iowa furnishes an excellent illustration of how the importation of feeder cattle has been a very small factor in spreading tuberculosis. There is probably no greater steer-feeding section in the country than southern Iowa. Each year large numbers are purchased at the western markets and brought in for feeding purposes without test. Yet, with this steady influx of feeding cattle during many years past, it is now being found that the breeding cattle in southern Iowa counties show but little more than one per cent infection, whereas the breeding cattle of the northern counties will average five per cent or more. The northern counties have recently gone into dairying more extensively and in the breeding-up process it is apparent that many tuberculous cattle were brought in—most of them before strict regulations governing interstate shipments were made.

The steer-feeding sections of Illinois show also a much lower infection than the dairy sections. The counties adjacent to Chicago grow very few dairy cattle and nearly all are brought in from other sections. This steady flow of dairy cattle, many of them tuberculous, is responsible for the very heavy infection not only near Chicago, but New York and other large cities.

While the damage caused by tuberculosis is greatest in the Middle West, the financial returns from eradicating the disease are also greatest here. When tuberculosis is eliminated from cattle it removes the principal cause of condemnations among swine and removes also one of the causes of tuberculosis among poultry. Investigations on the transmissibility of this disease

from cattle to poultry are not sufficient to warrant positive statements as to the extent of this transmissibility, but we do know that there is a great deal of avian tuberculosis in the Middle West, where the practice of feeding skim milk to chickens is common. We know also, through the investigations of Van Es, of Nebraska, and Graham, of Illinois, that tuberculosis in chickens is the cause of most of the retentions or slight cases in swine, which cause heads and viscera to be condemned, resulting in large accumulative losses.

Work Must Go On

The situation is such that we can not afford to lose any further time or spare any necessary expense in eradicating tuberculosis as quickly as it can be done. We have gone far enough to know that this disease can be completely eradicated from large herds and that it can be practically eliminated from entire counties. County area-testing has been the big factor in bringing about a material reduction in tuberculosis among cattle to date. The extension of this area-testing has been made possible by:

(1) The character of the work done by veterinarians, which has established public confidence,

(2) Favorable public sentiment, resulting in larger appropriations, and

(3) Substantial benefits derived by farmers in the counties which have been accredited.

It has been my privilege to observe the work of a large number of veterinarians engaged in this project. Its success in any county has been largely determined by the men employed. If the veterinarian is reliable, industrious, tactful and painstaking, his work meets with a ready response and full cooperation; otherwise not. In our national campaign, we have been exceedingly fortunate in the personnel of the six hundred veterinarians regularly employed and those assisting on part time. There have been, of course, some misfits, but relatively few.

When the campaign was launched, during 1917, we had a federal appropriation of $75,000.00 for tuberculosis eradication and a total of approximately $250,000.00 of state funds. We now have $3,560,000.00 of federal money and a total of $12,000,000.00 in state and county appropriations. The House of Representatives recently increased the federal appropriation $550,000.00 for the next fiscal year, and we have arranged for another hearing before the Senate Appropriations Committee,

at which we will present facts to show the necessity of a larger amount. As the Senate has heretofore shown a more liberal attitude toward this work, there is reason to believe that it will be increased for the fiscal year beginning July 1, 1926. The House of Representatives made $200,000.00 of the increase available on passage. We will ask the Senate Committee to make one million immediately available, in view of the fact that the federal appropriation is now exhausted in Illinois, Massachusetts, Washington and Minnesota, and will be exhausted in many other states before July 1, 1926.

With these increased appropriations, from year to year, the adoption of the intradermic test, which has trebled the number of cattle tested per man, and with the recent extension of county area-work, which facilitates the testing, there has been a great increase in the volume of work done. Starting with 20,000 cattle tested under the cooperative plan during 1917, it increased steadily each succeeding year. During the fiscal year ending July 1, 1925, the records showed a total of a little more than seven million cattle tested. Approximately one-third of the breeding cattle of the United States have been tuberculin-tested, the reactors slaughtered and the premises cleaned and disinfected. As a result, the retentions for tuberculosis on all cattle, including steers slaughtered under federal inspection, have been reduced from 2.6 per cent, retained for tuberculosis during 1916, to 1.5 per cent, retained during 1925.

Condemnations Decreased While Retentions Increased

Condemnations in swine decreased to the same extent during that period, but retentions continued to increase until the highest point (15.1 per cent) was reached during 1924. This was reduced last year to 14.6 per cent. The decline in cattle retentions but the increase in swine retentions made it appear, several years ago, that some other factor besides cattle was causing this increase. I called attention to this seeming inconsistency at the annual meeting of the American Veterinary Medical Association, at Denver, and the Eastern States Tuberculosis Eradication Conference, in Boston, four years ago. It appeared then that poultry might be the cause of the increase in swine retention and mention was made of that fact.

I shall always remember the disappointment that came to me, three years ago, when I saw the throat lesions of five hogs out of the first load to receive the ten-cent premium, shipped

from Hillsdale County, Michigan, to Buffalo, New York. Later loads of these accredited hogs gave retentions, but practically no condemnations. We shipped glands from these hogs to Dr. Van Es, of the University of Nebraska, who inouclated chickens and guinea pigs with them, the chickens taking the disease and the guinea pigs not, in every case except one, showing the type to be avian, with the hogs as the temporary host. The hogs from that county were tattooed with numbers, so that those showing lesions could be traced back to the point of origin. Many were traced to farms where there had been no reacting cattle. The hogs left on the premises reacted to avian tuberculin but not to the bovine.

Postmortem Records on Premium Hogs

There are now over one hundred fifty accredited counties in the United States. We have asked the packers to kill, separately, just as many loads from accredited counties, on which the premium is paid, as they can keep separate, without too much inconvenience. We have the postmortem reports on 206,318 of these accredited, premium hogs from accredited counties, of which number 25,377 (12.3 per cent) were retained for tuberculosis and 250 (.12 per cent) condemned for sterilization and grease. As nearly as we can determine, the retentions have been reduced approximately twenty-five per cent and the condemnations seventy-five per cent in hogs from accredited counties, as compared with hogs from non-accredited counties in the same section of country. The condemnations which are usually caused by the bovine type are very few in these accredited hogs, but the slight cases, caused for the most part by chickens, are far too numerous. With so many herds condemned, in which there is a loss of about fifty cents each, the ten-cent premium is not fully justified. In this connection it is of the utmost importance to carry on, simultaneously with the testing of cattle, intensive educational work to get farmers to raise young chicks on fresh uncontaminated ground, keeping them away from the general premises until the old infected flock has been disposed of, the house thoroughly cleaned and disinfected and until after the sunshine has had full opportunity to kill germs on the ground. It is simply a question of adopting a system of chicken-lot sanitation, which will not only remove the cause of much of the tuberculosis in swine, but will at the same time increase the production and the profits from poultry.

The packers are willing to pay the ten-cent premium above market price as long as the results somewhere nearly justify its payment and this will be the case if we can clean up chicken tuberculosis. I do not look upon this as a costly problem. The infected chicken flock can be sold in the usual way, burning up perhaps the advanced cases which show considerable emaciation. It will require no indemnity. The facts are that one can not afford to keep a badly infected flock. The quicker the flock is put on a health basis, the quicker the profits.

The advantage of having healthy flocks and herds are so great that we may expect to see many new counties placed on the accredited list this year and a very large increase in the number starting area-testing.

The Hillsdale County Experiment

When the Board of Supervisors of Hillsdale County, Michigan, five years ago, made the first appropriation of $3,000.00 for area-testing, there was much skepticism as to the outcome and it was only by the most careful and exhaustive presentation of arguments that the first fund of $3,000.00 was provided, with a vote of fifteen for and six against. After the county was accredited and the farmers had received $12,000 in premium checks on their hogs and an average of twenty-five dollars per head above the selling price on cows of the same quality as in the adjoining county, there was no longer any question about its desirability. Recently the Hillsdale Board voluntarily and without opposition voted $7,000.00 for a retest at the expiration of the three years of accreditation, to make sure that no tuberculous cattle had been brought in from surrounding counties.

It is doubtful if any county, now accredited, will permit serious reinfection. The advantages are too well understood. It means not only the elimination of a great economic waste but the prevention of many cases of human tuberculosis. It is much less expensive to clean up bovine tuberculosis in the average county than to build sanitariums for tuberculous patients.

The general satisfaction to all citizens in an accredited county is such that the national campaign will continue with still greater results than have already been accomplished. It is now only a question of a few years when the United States will be practically free from bovine tuberculosis. The satisfaction with this accomplishment will be so great that all who have participated will be glad that they have done their part.

This will be particularly true of your men in Illinois where, in all probability, more damage is being caused by tuberculosis than in any other state of the Union. We have every reason to believe that you are equal to the task.

THE HORSE AND MULE SITUATION

A recent issue of *Crops and Markets*, published by the United States Department of Agriculture, contained a great deal of statistical data relative to horses and mules. Mr. Wayne Dinsmore, secretary of the Horse Association of America, has studied these data and summarized them as follows:

1. Out of each 1000 horses on farms and ranges, those that were colts were as follows: 1910, colts 87.7; 1920, colts 63; 1925, colts 36.5. This confirms previous forecasts that production has been cut to less than one-half of what it was ten years ago.

2. Returns from crop reporters, covering their own farms for January 1, 1926, show that the number of colts per 1000 horses has increased in the Corn Belt and most of the northeastern states, but decreased in the south, central and western range states. For the U. S. as a whole, these returns from crop reporters, covering only their own farms, show colts per 1000 horses to be 40.6, January 1, 1926, as compared with 43.8, January 1, 1925. Despite this the outlook is favorable, for increases occurred in the states which raise the best class of horses and mules.

3. The Department of Agriculture estimates, for January 1, 1926, report that horses on farms have decreased about 5 per cent from Januray 1, 1925, leaving the number at 15,778,000; and mules have increased very slightly to a total of 5,780,000, making the grand total of horses and mules on farms 21,558,000, instead of 22,266,367, the total a year previous. This does not include horses and mules in non-agricultural work—these are not estimated by the Department of Agriculture—but there are believed to be nearly two million head in this class.

4. The farm value per head of both horses and mules on January 1, 1926, was higher than a year preceding in the central states, but generally lower in the southern states and in some of the eastern and far western states. Farm prices average slightly higher than a year ago; but here again one may be misled greatly by averages covering all horses, for while these are but little higher, prices on good horses have advanced considerably, both for farm and city use.

THE RELATION OF UTERINE HORN-POSITION OF THE BOVINE FETUS TO SEX, AND MIGRATION OF OVA IN THE COW

By C. C. PALMER

Department of Animal Industry, University of Delaware, Agricultural Experiment Station, Newark, Del.

The early diagnosis of pregnancy by rectal palpation is rapidly becoming recognized as a sound and valuable economic practice in dairy cattle management. During the early weeks (six to twelve) of pregnancy, it is usually possible to determine, without difficulty, the horn of the uterus in which the fetus is located. Veterinarians, after making a positive diagnosis of pregnancy, frequently inform the owner or caretaker, of the uterine position of the fetus, and such information has served to raise the question of the relation of horn-position of the fetus to the sex of the fetus. As the attending veterinarian may be asked for an opinion upon this subject, and as opinions are of little value unless backed by good evidence, it has occurred to the writer that data relevant to the subject would not be amiss. As it cannot be reasonably assumed that the uterine horns have anything to do with the sex of the fetus, any foundation for such a theory must trace back to the very ancient theory that the production of two sexes of offspring and their practically equal distribution in number are due to the formation of males by one ovary and females by the other, the left ovary usually being honored by the ascription of female-producing potencies.

Veterinarians engaged in making examinations for pregnancy are provided with a splendid opportunity for collecting data on the relation of the sex of the fetus to fetal position during intra-uterine life. However, before such data may be accepted as a reliable criterion, it is necessary to determine the frequency in cattle with which the ova produced by one ovary migrate to the opposite horn and there develop. This raises a physiological question upon which it is necessary to draw conclusions before attempting to summarize the data dealing with fetal uterine positions.

Presented at the annual meeting of the Delaware Veterinary Medical Association, Newark, Del., December 18, 1925.

On the Migration of Ova in the Cow

Although apparently no studies have been made upon the phenomena of ova-migration in cattle, it appears to be a generally accepted fact that such migrations occur frequently in other species. Marshall[1] states:

> "There is evidence, however, that ova which are discharged from one ovary do not always pass into the oviduct on the corresponding side. For example, instances have been known of animals with a bicornuate uterus becoming pregnant in the uterine horn on the side opposite to that on which the ovary had discharged (as indicated by the presence of a newly-formed corpus luteum). Moreover, it has been recorded that animals from which one ovary had been removed have become pregnant in the uterine horn of the other side, an observation which indicates that the ova which are discharged from one ovary may travel across the peritoneal cavity and enter the Fallopian tube which was connected with the other ovary."

Corner[2] collected data on the relationship of horn-location of embryos to corpora lutea occurring in the ovaries in sows and concludes that external migration of the ovum is a normal and very frequent occurrence in the sow. This writer states: "It is a very conservative estimate if we suppose that one or more ova migrate in 50 per cent of all ovulations in the sow." Leopold,[3] in 1880, excised one ovary and the opposite uterine tube, and found that the animals could still become pregnant. The frequency of external migration of the ovum is difficult to estimate in the human subject, since it is demonstrable only in the presence of some abnormal condition. Corner, however, states: "Migration of the ovum is a well-attested fact, in the human subject," and quotes J. Whitridge Williams,[4] who found the corpus luteum in one ovary and the embryo in the opposite tube, in five out of thirty carefully recorded cases of extra-uterine pregnancy. Mayrhofer[5] estimates tentatively that migration must occur at least once in every ten ovulations in the human female.

Since cattle are usually uniparous animals, the corpus luteum of pregnancy an accurate index of the ovary responsible for the embryo, and both ovaries and uterine horns readily palpable, the species is an ideal one for studies on the migration of ova. Examinations for detecting evidence of migration of ova in the cow are best made during the interval between the sixth and twelfth weeks of pregnancy. Examinations made during advanced pregnancy are not as satisfactory, owing to the great volume of the uterus and the difficulty of moving it, a procedure usually necessary in order to palpate both ovaries and check the relationship of the corpus luteum and gravid horn.

As it is to the best interest of the owner to have the diagnosis of pregnancy established as early as possible in the gestation-

period, the two studies (pregnancy determinations and evidence of ova migration) are conveniently made during the one examination. In making several hundred examinations for pregnancy in recent years, particular attention has been paid to the relationship of the horn-location of the fetus to the ovary containing the corpus luteum of pregnancy. No instances have been observed in which the horn-location of the fetus did not correspond with the ovary containing the corpus luteum. In some cases of early pregnancy very careful manipulation of the horns of the uterus is necessary in order to determine accurately the horn containing the fetus. This is due to variations in position of the horns and to the fact that the uterine horns of the cow are spirally curved. Owing to these anatomical relations, mistakes in recognizing the gravid horn will not be infrequent if the examination is not made with care, and the ovaries included. Occasionally cases have been encountered in which it was believed, at first, that the corpus luteum was contained in the ovary on the side opposite to that of the gravid horn, and that evidence of migration of the ovum had been observed in the cow. When such cases were rechecked, however, and the horns carefully palpated (traced out), it was discovered that a mistake had been made in the identity of the horn containing the fetus.

Conclusions on the Migration of Ova in Cattle

From the work which has been done on other species, it appears that migration of the ovum is of frequent occurrence.

The phenomenon, if it does occur in the cow, must be considered a rare occurrence, as no evidence of migration was observed in the examination of a large number of pregnant cows.

On the Relation of Sex of Offspring to Uterine Horn-Position During Intrauterine Life

Since no evidence has been observed of migration of the ovum in the cow, it is assumed that the uterine horn-position of the fetus represents an ovum from the ovary of the same side.

The data presented in the following tables were obtained from a herd of pure-bred Holstein-Friesian cattle of various ages. Statistics have been compiled in this herd, for a number of years, on the ratio of male to female offspring. Table I shows the ratio of all male and female calves, born in this herd during the past six years.

For the sex studies, one hundred pregnant cows were selected at random. Sixty of these animals were recorded as pregnant in

TABLE I—*Sex ratio of all calves for six-year period*

YEAR	CALVES	BULL		HEIFER	
		No.	%	No.	%
1920	149	76	51.00	73	48.99
1921	166	93	56.02	73	43.97
1922	155	85	54.83	70	45.16
1923	142	75	52.81	67	47.18
1924	190	104	54.75	86	45.26
1925	180	90	50.00	90	50.00
AVERAGES			53.23		46.76

the right horn and forty were recorded as pregnant in the left horn. From the sixty right-horn pregnancies, there resulted twenty-eight bull calves and thirty-three heifer calves.* From the forty left-horn pregnancies, there resulted twenty-two bull calves and eighteen heifer calves. When the total number of bull and heifer calves is taken into consideration, it will be noted that there were fifty bull calves and fifty-one heifer calves. The majority of the cows selected for this study calved during the year 1925 (some in 1924) and it may be noted how closely these records check with the general herd-records, as shown in table I, in which year the bull and heifer calves born in the herd were equal in number.

Tables II and III show in detail the results of the observations made on one hundred pregnant cows.

EVIDENCE IN OTHER SPECIES

Studies to determine the influence of the ovaries, by virtue of their position in one or other half of the maternal body, upon the sex of the offspring, in which data are collected upon the sex and uterine positions of feti, are of little value unless the frequency of migration of the ova is well understood for the species concerned. Since Seligson (1895)[6] formulated the hypothesis that in mammals the right ovary gives rise to eggs that produce male offspring and the left to eggs that produce female offspring, much of the value of many of the studies upon this simple hypothesis is lost, as workers failed to consider the possibilities of ova-migration. Parker,[7] working with the sow, however, recognized the possible disturbing effect of migration of the ovum. He took large litters and omitted from his counts the pigs in the middle of the uterine horns, which may be thought most likely to be the mixed product of both ovaries, and counted only the two

*Cow 502 produced twin heifers (see table II).

TABLE II—*Cows pronounced pregnant in the right uterine horn*

EAR-TAG NUMBER OF COW	SEX OF OFFSPRING	
	BULL	HEIFER
53	*	
55		*
278	*	
314		*
494	*	
502		** (twins)
544		*
554	*	
577		*
582	*	
590	*	
608	*	
647	*	
655		*
671	*	
677	*	
705	*	
742		*
751		*
762		*
772		*
778	*	
786		*
788		*
811		*
813	*	
814		*
817		*
821	*	
826		*
844	*	
845		*
846		*
847		*
848		*
849	*	
851		*
852	*	
853		*
857		*
860	*	
863	*	
864	*	
865		*
876	*	
885	*	
891	*	
892	*	
898		*
902	*	
911	*	
913		*
914	*	
921		*
934		*
960	*	
565		*
782		*
776		*
566		*
Totals	28	33

TABLE III—*Cows pronounced pregnant in the left uterine horn*

EAR-TAG NUMBER OF COW	SEX OF OFFSPRING	
	BULL	HEIFER
447		*
485	*	
542		*
623	*	
645	*	
658	*	
661	*	
673		*
696	*	
715	*	
734		*
739	*	
740		*
758		*
770		*
774	*	
784		*
789		*
795		*
818	*	
824		*
825	*	
827	*	
830	*	
850		*
854		*
858	*	
859	*	
861	*	
884	*	
887	*	
900		*
903	*	
905		*
909		*
924	*	
931	*	
737		*
503	*	
872		*
Totals	22	18

feti next to each ovary and the two next to the junction of the horns. The results, from the tabulation of 2690 feti, gave an almost absolutely equal distribution of the sexes on the two sides. In these studies it was observed that the total number of males outnumbered the females, the ratio being 1026 to 1000. Parker's conclusions, that in the pig the ovaries, by virtue of their position in one or the other half of the maternal body, exert no influence on the sex of the offspring, are in line with such experimental work as that of Doncaster and Marshall[8] and

of King,[9] on albino rats, according to which a single ovary, after removal of its mate, can give rise to eggs which produce males and females.

Conclusions

1. Evidence of migration of the ovum was not observed in the cow.

2. The sex-ratio of calves developed in the right and left uterine horns is approximately equal.

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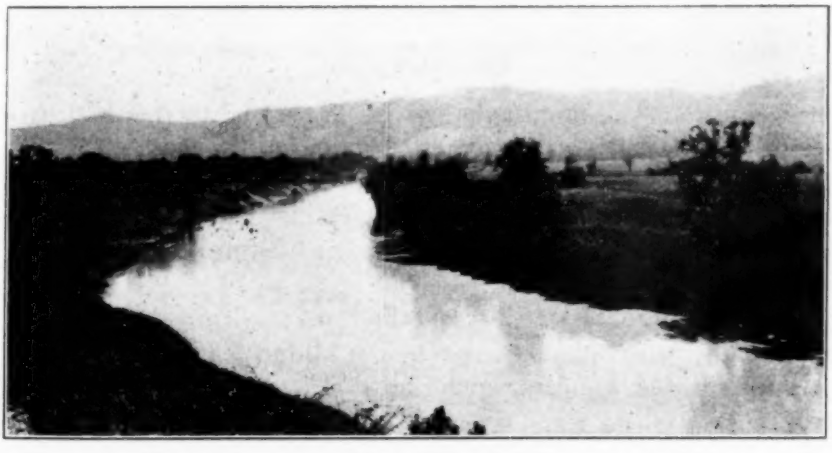
MEDALS FOR CUBAN VETERINARIANS

The Cuban National Veterinary Association has awarded gold medals to Dr. Bernardo J. Crespo, editor of *Agricultura y Zootecnia*; Dr. Francisco Etchegoyan, president of the Cuban Veterinary Association and Dr. Angel Iduate, editor, for the excellent work done by them in advancing the interests of the veterinary profession in the republic of Cuba.

ON THE WAY TO LEXINGTON



Tne Knobs Escarpment, up the Kentucky River at Irvine, Estill County.

WHY ERADICATE FOOT-AND-MOUTH DISEASE BY THE SLAUGHTER METHOD, INSTEAD OF ENDEAVORING TO CONTROL IT BY QUARANTINE METHODS?

By G. E. GOLDEN, *Sioux City, Iowa*

U. S. Bureau of Animal Industry

In presenting for publication in the JOURNAL the accompanying pictures, taken during my work on foot-and-mouth disease, it seems appropriate that I make some statement regarding my observations and impressions.

During my field experience in several outbreaks of foot-and-mouth disease, the question has been asked frequently, "Why

FIG. 1. Two cows showing characteristic drool (15 minutes before slaughter). Texas outbreak, 1925

eradicate foot-and-mouth disease by the slaughter method, instead of endeavoring to control it by quarantine methods?" In some instances the economic wisdom of the slaughter method was questioned, inasmuch as we were dealing with a disease the mortality of which, except in the malignant form, was less than three per cent.

At other times the slaughter method was condemned on account of the cruelty to animals, inasmuch as all but a small percentage of the affected animals would have recovered had they been

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allowed to live. If the criticisms of the methods employed for the suppression of this disease came from those whose scope of information was limited, and whose influence in their community was nil, the handicap placed in the way of quick and early eradication would be greatly diminished.

Taking up first the question of economy, the point to be decided is, whether it would be to the interest of the taxpayers, especially those engaged in the live stock industry, to allow any highly contagious disease to gain a foothold in this country when it could be prevented. In this connection it might be well to stop and consider the hundreds of millions of dollars which could be saved annually in this country had hog cholera and bovine

FIG. 2. Characteristic drool of foot-and-mouth disease (15 minutes before slaughter). Texas outbreak, 1925

tuberculosis been handled in the beginning in a manner similar to the methods we now employ in the eradication of foot-and-mouth disease.

On account of the highly contagious nature and rapid spread of this disease, it is impossible to provide a practical quarantine sufficient for its isolation, and any other method than the slaughter method would, in the opinion of the writer, meet with disastrous results, and in a limited period of time we would have implanted in this country a disease far more serious than either hog cholera, which is now controlled by vaccination at a great expense to the hog-raiser annually, or bovine tuberculosis, which

FIG. 3. Erosion at tip of tongue. Texas outbreak, 1925

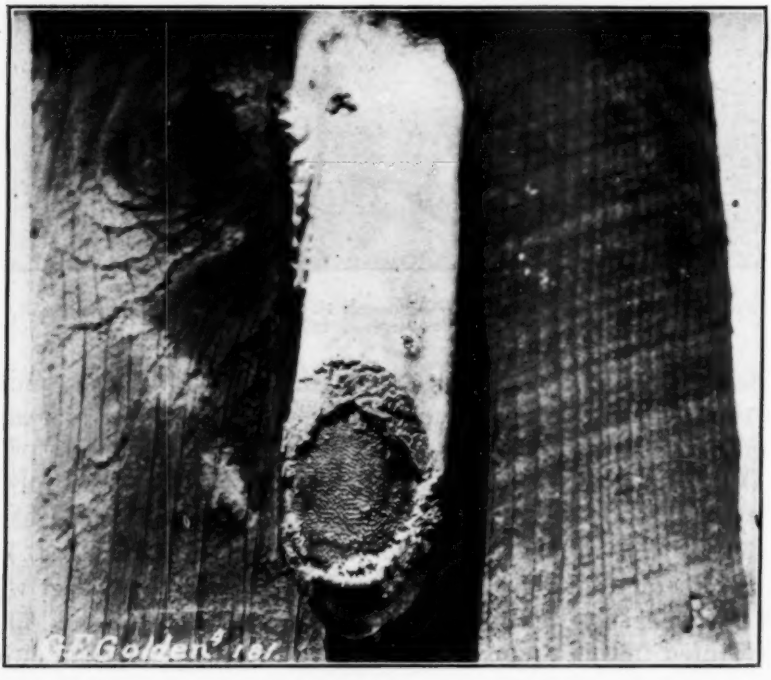

FIG. 4. Lesion on tongue of cow killed during the California outbreak of foot-and-mouth disease, 1924

is now being eradicated in a systematic manner at an expense to the country of millions of dollars annually.

While the mortality resulting from this disease is comparatively small, still a very conservative estimate of the depreciation on each animal passing through the disease is placed at about 15 per cent. of the value of the animal. When animals become affected they refuse to eat for a time on account of the sore mouth and tongue; consequently, the animal declines rapidly in flesh. In cows, the udders sometimes become involved and

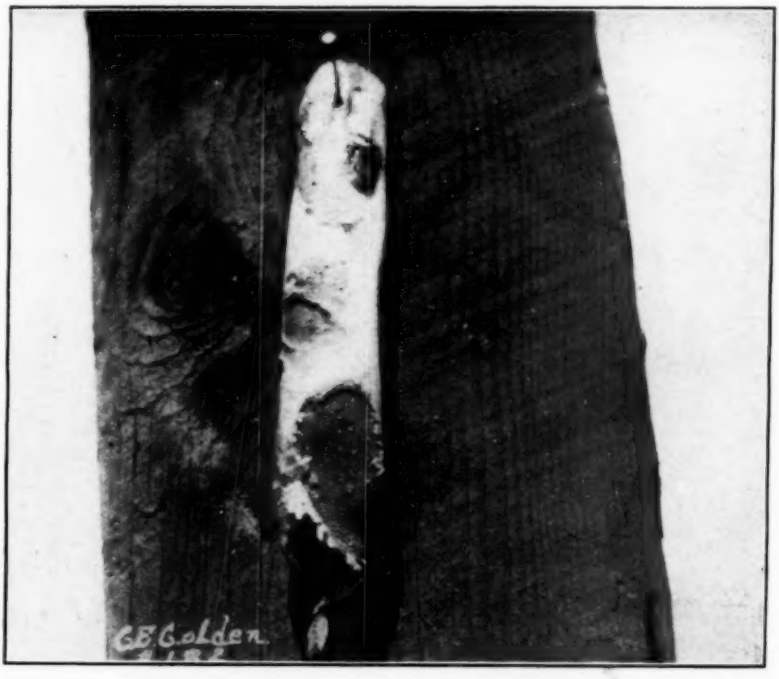

FIG. 5. Lesion on tongue of cow killed during the California outbreak of foot-and-mouth disease, 1924

ruined. Cows in calf may abort, and fresh cows may dry up. When the feet are involved, the affected animals become very lame, resulting in permanent injury to the feet.

The loss resulting to the live stock industry in those localities quarantined on account of the disease is comparatively small, as compared with the loss suffered by other industries in the same locality. When a district is placed under quarantine and traffic is either suspended entirely or restricted partially, all business in that community suffers to a more or less extent; consequently, the necessary quarantining of a zone surrounding

the center of infection plays a leading role in the economic loss sustained.

In some European countries, on account of the foothold gained, it is now possible to keep the disease under control only by quarantine methods. To resort to the slaughter method of eradication in these countries would in some instances cause the depletion of a greater part of their food-producing animals.

FIG. 6. Lesion on tongue of cow killed during the California outbreak of foot-and-mouth disease, 1924

In order to see at a glance the wisdom of eradication rather than control of this disease, it might be well to refer to the published report of the susceptible live stock population in Germany in 1911; also the number of animals affected with the disease. Compare this report with the available report of the susceptible animals in the United States in 1924, and imagine the loss to our live stock industry alone if we were to allow the disease to gain a foothold in this country, possibly to become epizootic as in Germany in 1911.

Live Stock Report of Germany, 1911

Total number of animals susceptible to foot-and-mouth disease, 51,319,000. Cattle affected, 3,366,369. Sheep affected, 1,602,987. Hogs affected, 2,555,391. Goats affected, 53,674.

Fig. 7. Lesion on tongue of cow killed during the California outbreak of foot-and-mouth disease, 1924

Live Stock Report of the United States, 1924

Kind of animals	*Number*	*Price per head*	*Farm value*
Milk cows	24,673,000	$52.16	$1,287,044,000
Other cattle	42,126,000	24.99	1,052,599,000
Hogs	65,501,000	9.75	638,793,000
Sheep	38,361,000	7.88	302,092,000

Average price per head, $19.25.

FIG. 8. Slough of tissue in the interdigital space. Texas outbreak, 1925

If, in the 1924 outbreak, the same proportion of our animals became affected as in the 1911 outbreak in Germany, the disease would have extended to 24,285,414 animals.

FIG. 9. Slough of skin on coronary band, the result of ruptured vesicles. Texas outbreak, 1925

Figuring the average price of susceptible animals in the United States, in 1924, at $19.25 per head, the value of the affected animals would have amounted to $467,493,229.50. A depreciation of 15 per cent on the affected animals would have caused a direct loss in value of the live stock of $70,124,132.92 for that year.

In the six outbreaks in this country since 1902, by means of the slaughter method of eradication, we were able, with the exception of the year 1914, to confine each outbreak to within a small area of the country, and to remove all quarantine restrictions within a limited period of time.

During the last twenty-four years, some part of the country has, at one time or another, been under quarantine from three to

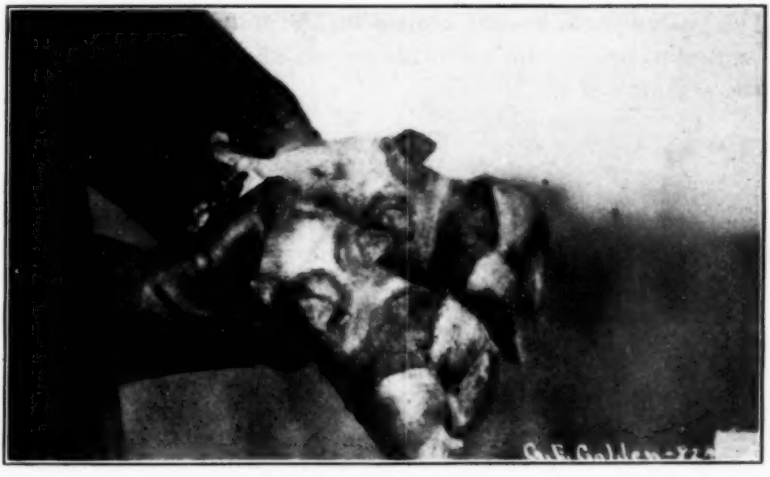

FIG. 10. Separation of heel of cow. Texas outbreak, 1925

eighteen months at a time, or a total of about forty out of 288 months, about seventeen per cent of the time. Inasmuch as the direct loss to the live stock industry is but a small part of the total loss to business in the quarantined areas, the length of time under quarantine, plus the size of the area involved, should be a vital factor in determining the value to this country in preventing the disease from becoming permanently established here.

The total cost of eradicating our outbreaks buring that period was less than one-half of what losses from the disease and quarantine would cost the live stock industry in one year, if we were to use the same methods in handling the disease as are now practiced in some foreign countries where the disease is permanently established.

The humane feature of the argument can be disposed of by saying that all susceptible live stock are food-producing animals, and their ultimate destination is the slaughterhouse.

The animals slaughtered in abattoirs for food are all in an apparently healthy condition, while the animals shot in corrals, and trenches, preparatory to disposal on account of this disease, are in many instances pitiable sights to witness. In many cases the mucous membrane, lining the mouth, tongue, and gums, has sloughed off in large patches, leaving these surfaces in a raw state, which is evidenced by the depressed and painful expressions on the faces of animals affected. Also, in many cases, the feet are so painfully involved as to cause the affected animals to lie down continuously in order to avoid pain.

The pathological lesions, shown on the tongues in the pictures presented in connection with this article, should convince anyone of the severity of the disease.

NEWS ITEMS

The city council of Aurora, Ill., passed an ordinance, May 3, 1926, forbidding the sale of milk from untested cows.

There was 147,010 practicing physicians in this country in 1925 and the average gross income was $3,000 a year, or $440,000,000 for all.

The Lexington (Ky.) *Herald* published an anniversary edition, April 15, 1926, marking "a hundred years of racing in Kentucky." Among the articles which featured the edition was one by Dr. W. W. Dimock, of the University of Kentucky, entitled, "Breeding Diseases of Horses Are Studied."

On May 1, 1926, Dr. T. E. Munce, state veterinarian of Pennsylvania, ordered all transportation companies to quarantine cattle en route from points in Illinois to Pennsylvania. Cattle for dairy or breeding purposes must be held for sixty days during which a re-test will be made. Those from accredited areas accompanied by official certificates will be accepted. The action of Dr. Munce was quickly followed by similar action on the part of the veterinary officials of Michigan, Maryland, New York and Delaware.

VESICULAR STOMATITIS IN ITS RELATION TO THE DIAGNOSIS OF FOOT-AND-MOUTH DISEASE

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Though vesicular stomatitis is not a disease that is directly of great economic importance, it does, because of the similarity of its lesions in cattle to those of foot-and-mouth disease, greatly complicate the diagnosis of the latter. It is easy to mistake the one disease for the other. It causes more uneasiness to the diagnostician than all the other diseases which may be mistaken for foot-and-mouth disease put together. Any work, therefore, that will make it possible to distinguish certainly and quickly the one from the other is worth while, because quick and certain action, when dealing with so contagious a plague as foot-and-mouth disease, is of vital importance. Mistakes in diagnosis are apt to be very costly.

The lesions of vesicular stomatitis reported in the past have been confined to the mouth and tongue. The absence of foot lesions has been of some help in making a diagnosis, though this by no means was taken as conclusive evidence. Recent observations have shown, however, that foot lesions do occasionally occur in vesicular stomatitis and that when they do, they are practically indistinguishable from those found in foot-and-mouth disease. Two cases of this kind in cows have come under the writer's observation within the past year. Each of these, in addition to gross lesions on tongue and lips, also had very great lesions in a single foot, identical in appearance, so far as he could determine, with those of foot-and-mouth disease. The lesions in the one foot were so great that had they been distributed among two or more feet the animal would have presented a perfect picture of a marked and typical case of the much-dreaded disease. A very large vesicle extended over the entire interdigital space, and other vesicles were present at the coronet and at both bulbs of the heel; the claws were loosened from the deeper structures over wide areas beginning at the heel. Cases of this kind make the prompt and certain diagnosis of the disease with our present knowledge very difficult.

Received for publication, April 17, 1926.

Transmission of Vesicular Stomatitis to Guinea Pigs

In 1920, Waldmann and Pape[1] announced that they had found that guinea pigs were susceptible to foot-and-mouth disease and that they had easily and with great regularity succeeded in infecting them. Other investigators have also been able to transmit the disease to these animals with some strains of the disease but not with all. In the 1924 outbreak of the disease in Texas, two guinea pigs were included with the horses, calves and pigs inoculated at the beginning of the outbreak for diagnostic purposes. These two guinea pigs each had well-developed vesicles which showed no signs of rupturing, on both metatarsal pads, the entire surface of each pad being involved, when the writer first saw them about 48 hours after they were inoculated. The calves and pigs developed well-marked lesions but the horses showed nothing. At the beginning of the 1925 outbreak two guinea pigs were also included in the test animals, but only one of these showed lesions and they were not well marked within 48 hours after inoculation. Of course there was no opportunity to study these lesions as it was necessary to destroy all of the test animals together with those of the affected herd as soon as a positive diagnosis was made.

The lesions, as described by Waldmann and Pape in their first announcement and in a second communication[2] which appeared in 1921, followed cutaneous, intracutaneous, subcutaneous, intravenous and intra-abdominal inoculations of vesicular fluid from an animal affected with foot-and-mouth disease.

The cutaneous inoculations were made by scarifying the plantar surfaces, the metatarsal pads, ears, lips, or tongue and rubbing the virus on the wounded surface. Inoculation vesicles, which contained as much as 0.1 cc of water-clear lymph, appeared in from 24 to 28 hours. The vesicles regularly reached their height within two days and were usually followed, on from the third to seventh day, by other vesicles not so large, on the uninoculated legs and frequently on the tongue. Neither the inoculation vesicles nor those that appeared later ruptured, but began to dry up at the third day. Lesions present in the mouth or on the tongue were accompanied by excessive salivation. With regard to general symptoms it was observed that, from 12 to 24 hours after inoculation, the temperature had risen about 1° C., and the elevation continued with variations until

the vesicles, elsewhere than at sites of inoculation, had obtained their full development. Except when the mouth was affected there were no special symptoms.

Intravenous and intraperitoneal injections of the virus were followed by vesicles which developed simultaneously on all the extremities and sometimes on the tongue on the fourth day after injection.

Subcutaneous or intracutaneous inoculations, if made on the hairless portions of the skin, soles of feet, metatarsal pads, etc., followed the same course as the cutaneous inoculations but, if made on portions covered with hair, they followed the same course as intravenous and intra-abdominal injections, that is, inoculation vesicles did not appear.

Attempts to transmit the disease to guinea pigs by feeding, by direct exposure to affected guinea pigs, or by rubbing the virus on the unwounded skin, failed.

The authors draw the conclusion, after testing virus from different sources, that it is easy to infect guinea pigs, even with virus obtained from outbreaks in which the disease is running a quite benign course, but that with weak virus the appearance of the inoculation lesions is delayed and generalization, manifested by the appearance of vesicles removed from sites of inoculations, may be absent. Hobmaier[3] caused lesions in guinea pigs with four strains and failed to do so with four others.

It was hoped that the guinea pigs would prove of considerable value in the diagnosis of foot-and-mouth disease, but it now appears that vesicular stomatitis also causes lesions in guinea pigs very similar to those described by Waldmann and Pape. This will be shown by the record of the following work of the Experiment Station of the Bureau of Animal Industry.

Early in 1925, an outbreak of vesicular stomatitis occurred in a carload of young cattle that had been shipped from Kansas City to Richmond, Ind., and placed on farms near that city. About 50 per cent of these cattle had lesions in the mouths or on the tongues, but principally on the latter. The lesions were well marked and very similar in appearance to those of foot-and-mouth disease. The affection was proved to be vesicular stomatitis by the inoculation of five horses, all of which developed typical lesions of the disease, accompanied by elevated temperature within 44 hours. The loosened epithelium from a vesicle on the tongue of one of these horses was collected, placed in 50 per cent glycerin and brought to the Bureau's Experiment

Station, and was the origin of the virus from which all of the work described in this paper has been done. The virus has now (March 1) been carried through nine horses and fourteen cows since it arrived at the Station and seems to have lost none of its virulence. The last eight passages have been entirely through cattle. At one time it seemed that it was losing its virulence by passing through cattle, but subsequent experience proved this not to be the case.

The infectious material brought from Indiana was made into an emulsion by grinding it in a mortar with a small amount of 0.85 per cent salt solution and was used on May 25, 1925, to inoculate a horse (No. 245) by scarification on the tongue and upper lip, two guinea pigs each by scarification on one of the metatarsal pads and the rear of the corresponding foot, and four guinea pigs subcutaneously inside of the thigh. Forty hours later, the horse had developed large vesicles on the tongue, and the two guinea pigs inoculated by scarification each showed the beginning of small vesicles at the site of inoculation on the hind foot. Two days later each guinea pig also had a vesicle on the inoculated metatarsal pad. The four guinea pigs injected subcutaneously did not develop lesions.

Vesicular fluid collected from horse 245, on May 27, was used the same day to inoculate guinea pigs, intra-abdominally, intradermally, and cutaneously by scarification on the metatarsal pad. Two guinea pigs were inoculated by each method. One of those inoculated intra-abdominally gave evidence of a vesicle forming on one foot on the fourth day after inoculation and on the sixth day two large vesicles had formed on the plantar surface of the left fore foot and one on each metatarsal pad extending over almost its entire surface. The companion guinea pig failed to show lesions. The intradermally-injected guinea pigs did not develop lesions nor did rabbits inoculated intravenously or cutaneously, nor white rats and mice inoculated subcutaneously at the same time. The guinea pigs, inoculated cutaneously by scarification on the metatarsal pad, both showed swelling and sensitiveness at sites of inoculations on the second day, and well-marked vesicles on the third day after inoculation.

The virus from horse 245 was passed through a bovine animal and then used to inoculate another horse (No. 192). This horse developed vesicles on the tongue on the second day after inoculation. On June 10, 1925, freshly-collected fluid from a vesicle on the tongue of this horse was diluted with 0.85 per cent salt

solution in the proportion of about one part of vesicular fluid to six of salt solution and used at once to inject six guinea pigs (Nos. 89406 to 89411 inclusive) intra-abdominally with 1 cc. The guinea pigs developed lesions as follows:

G. P. 89406	June 15.	Temperature, 10 a.m., 103.4° F.* No lesions visible.
	June 16.	Vesicles both fore feet and one hind one.
G. P. 89407	June 15.	Temperature, 10 a. m., 103.9° F. Large vesicles forming on both fore feet and one hind one.
G. P. 89408	June 15.	Temperature, 10 a. m., 102.8° F. Vesicles on both fore feet and one hind one.
G. P. 89409	June 15.	Temperature, 10 a. m., 105.0° F. Large vesicles forming on both fore feet and one hind one.
G. P. 89410	June 15.	Temperature, 10 a. m., 103.5° F. Large vesicles forming on all four feet.
G. P. 89411	June 15.	Temperature, 10 a. m., 103.0° F. Vesicles forming both fore feet.

*The normal temperature of the guinea pig is about 101.6° F.

The animals were not examined on June 14 but were on the preceding day, when all appeared normal.

Guinea pig 89409 was killed at 3 p. m. on June 15, at which time its temperature had dropped to 103.0° F. Autopsy did not reveal any lesions of the mouth or internal organs.

The lesions in the remaining guinea pigs were all practically healed on June 26, or eleven days after they appeared.

The dose given to the above guinea pigs was very large, which no doubt accounts for all of the animals becoming infected at a comparatively early date. Subsequent inoculations by the same method, but with much smaller doses and with less fresh virus, did not result in nearly so large a proportion of positive results, and the period of incubation was usually longer.

The above preliminary work has been followed by a more careful study of the character, time of appearance and duration of the lesions. A relatively large number of guinea pigs have been used for this purpose and several methods of infection have been tried.

To give the records of all of these animals would require much space, exhaust the patience of the reader and accomplish little more than can be done by giving the following examples of selected representative groups.

Group I

February 13, 4 p. m., guinea pigs 91937 to 91942, inclusive, each inoculated cutaneously by scarification, right metatarsal pad and rear of right hind foot, with emulsion of epithelium collected from freshly-ruptured vesicles on tongue of cow 1226 on Jan. 30 and that had been kept in a paraffin-sealed tube in

the ice-box. The sites of inoculation were scarified with an ordinary sewing-needle and the emulsion rubbed on with a small pledget of cotton. Lesions developed in the guinea pigs as follows:

G. P. 91937. Vesicles forming at site of inoculation, 42 hours after inoculation. Died the following day as a result of an injury. Skin separated from deeper structures over entire surface of right metatarsal pad and rear of foot.

G. P. 91938. Inoculation vesicles forming, 42 hours after inoculation; well formed at the 66th hour. Temperature 102.0° F.; on the following day the temperature had risen to 103.0° F., and on the next, or the fifth day after inoculation, it was 104.0° F., and a vesicle had formed on one fore foot. Two days later another vesicle had appeared. The animal was killed on the thirteenth day after inoculation, when the vesicle at site of inoculation had almost healed, but the others were just beginning to do so, the loosened skins still being in situ.

G. P. 91939. Inoculation vesicle forming at 42nd hour, well formed at the 66th, temperature normal. No vesicles other than at site of inoculation appeared. Lesions healed on the thirteenth day after inoculation.

G. P. 91940. Inoculation vesicle 42nd hour; temperature at 66th hour, 104.0° F. Twenty-fours later it was 101.0° F. Systemic infection manifested by appearance of a large vesicle on left fore foot seventh day after inoculation, temperature normal. Killed six days later, both lesions about healed.

G. P. 91941. Inoculation vesicle forming at 42nd hour; well formed at the 66th hour; temperature normal. Large vesicle right fore foot on the seventh day after inoculation. Killed at this time. The second vesicle to form extends over entire plantar surface, tissue beneath the loosened skin very raw. Inoculation lesion healing, covered by the dried skin.

G. P. 91942. Inoculation vesicle forming 42nd hour; well formed at 66th hour; temperature 102.6° F. Vesicles also appeared on both fore feet and left metatarsal pad on the seventh day after inoculation. Animal was killed six days later when the inoculation lesion had healed and the others had begun to do so but were still covered by the loosened dead skin which was still moist.

Group II

February 15, 12 noon, guinea pigs 91955 to 91961, inclusive, each inoculated cutaneously in the same manner as the ones recorded above with emulsion of epithelium collected from a freshly-ruptured vesicle on the tongue of calf 1287. The guinea pigs were inoculated two hours after the material was collected, whereas in the preceding group it had been kept fourteen days in the ice-box. Lesions developed in the guinea pigs as follows:

G. P. 91955. 23 hours after inoculation, temperature 104.6° F.; site of inoculation swollen. 50th hour temperature, 104.4° F.; very large inoculation vesicle. Large vesicle filled with clear, watery fluid, left hind foot, on the eighth day after inoculation. The animal was killed two days later, when the inoculation vesicle was healed but still covered by a scab. The other vesicle contained no fluid but the loosened skin was intact and was still moist; healing of the underlying tissue had begun.

G. P. 91956. 23 hours after inoculation, temperature 103.0° F.; site of inoculation swollen. 50th hour, very large inoculation vesicle. The following day appetite very poor. A vesicle appeared on right fore foot on the eighth day, temperature normal. Animal killed two days later, when inoculation lesion was healed and the other one was still covered by the loosened moist skin.

G. P. 91957. 23 hours after inoculation, temperature 102.6° F.; site of inoculation swollen. 50th hour, temperature 103.4° F.; large inoculation vesicle. Animal died of an intercurrent disease on the eighth day after inoculation. No vesicle, in addition to the one at site of inoculation, had then appeared. Inoculation lesion healing.

G. P. 91958. 23 hours after inoculation, temperature 103.8° F.; swelling at site of inoculation, 50th hour, temperature 103.4° F.; very large inoculation vesicle. Animal very quiet and appetite poor. Killed 24 hours later. Skin over entire surface of the right metatarsal pad and rear portion of hind foot loosened and white in color. Underlying tissues swollen. No fluid present. No other lesions.

G. P. 91959. 23 hours after inoculation, temperature 104.6° F.; site of inoculation swollen. 50th hour, large inoculation vesicle. Temperature on the fifth day after inoculation, 99.6° F. On the eighth day other large vesicles were present on soles of both fore feet and the left metatarsal pad and hind foot. Killed two days later. Skin loosened over entire plantar surfaces of both fore feet, still intact and moist but no serum present. Loosened skin torn from entire left metatarsal pad, leaving a raw surface. Inoculation vesicle healed.

G. P. 91960. 23 hours after inoculation, temperature 104.8° F.; site of inoculation swollen. 50th hour, temperature 103.0° F.; large inoculation vesicle. Killed on tenth day after inoculation. No other vesicles had developed. Inoculation vesicle nearly healed.

G. P. 91961. 23 hours after inoculation, temperature 104.0° F.; site of inoculation swollen. 50th hour, temperature 103.4° F.; inoculation vesicle formed. Fifth day, temperature 100.0° F. Eighth day, very large vesicle had formed on left metatarsal pad. Large amount of skin stripped from inoculation vesicle; temperature 102.6° F. Killed on tenth day after inoculation. Inoculated metatarsal pad much thickened and healing slowly. Skin loosened over entire left metatarsal pad, still moist. Small vesicle left fore foot.

All of the above guinea pigs had poor appetites on the third and fourth days following injection.

Group III

This group of six guinea pigs was inoculated on February 18, 1926, in the same manner but with virus taken from guinea pigs that had been inoculated with virus from calf 1287. They developed lesions as follows:

G. P. 91968. 19th hour after inoculation, temperature 104.8° F.; 24th hour, 104.2° F.; 43rd hour, 101.8° F., very large inoculation vesicle. Large vesicles both fore feet on sixth day after inoculation. Killed three days later. Inoculation lesion about healed. Fresh vesicle left hind foot.

G. P. 91969. 19th hour after inoculation, 103.8° F. 24th hour, 105.4° F.; site of inoculation swollen. 43rd hour, 102.4° F., vesicle at site of inoculation. Large vesicle left fore foot on seventh day after incoulation. Killed on the ninth day. Inoculation vesicle nearly healed but the other one had not begun to heal.

G. P. 91970. 19th hour after inoculation, temperature 105.0° F. 24th hour, 105.4° F., site of inoculation swollen. 43rd hour, temperature 102.2° F., inoculation vesicle formed. 6th day, a vesicle had formed on left hind foot. 7th day, additional vesicles left metatarsal pad and left fore foot. Killed two days later. Primary lesions healing slowly. Dead moist skin can be easily stripped from the entire plantar surface of left fore foot and entire surface of left metatarsal pad, leaving more or less raw surface beneath.

G. P. 91971. 19th hour, temperature 104.8° F. 24th hour, 104.8° F., site of inoculation swollen. 43rd hour, 103.0° F., inoculation vesicle seems to

be forming. Large inoculation vesicle on following day. 6th day, other vesicles had formed on both fore feet, temperature 103.6° F. 7th day, vesicles all four feet. Killed two days later. Inoculation vesicle healing but the others present raw surfaces covered by loosened skin which is still moist and intact. No vesicular fluid present.

G. P. 91972. 19th hour, temperature 104.6° F. 24th hour, 104.8° F., site of inoculation swollen. 43rd hour, inoculation vesicle forming, temperature 102.6° F. On the following day, temperature 101.4° F., large inoculation vesicle. Killed ninth day after inoculation. The lesion at site of inoculation healing. No other vesicles formed.

G. P. 91973. 19th hour, temperature 103.6° F. 24th hour, 105.4° F., site of inoculation much swollen. 43rd hour, inoculation vesicle forming. 7th day, other vesicle seems to be forming on right fore foot. 9th day, vesicles have formed on both fore feet. Inoculation vesicle healing.

The six animals comprising the first of the above groups of guinea pigs, and which were inoculated cutaneously with virus from the tongue lesions of a cow when the disease was at its height, but which had been kept for two weeks in the ice-box, all developed inoculation vesicles and four of them showed systemic infection by the appearance of vesicles removed from sites of inoculations; a fifth died before vesicles other than at site of inoculation had time to develop. The inoculation vesicles were forming at the 42nd hour after inoculation and were fully formed 24 hours later. Vesicles due to systemic infection appeared in one of the guinea pigs on the fifth day after inoculation, accompanied by a temperature of 104.0° F., and in the remaining three on the seventh day. These were unaccompanied by elevation in temperature. No temperature was taken until the 66th hour, at which time one animal only had an elevated temperature.

Of the seven animals of the second group which received the virus from a freshly-ruptured vesicle on the tongue of a calf two hours after it was collected, all showed swelling at site of inoculation, with temperature ranging from normal to 104.8° F. Well-formed vesicles were present in all, at the 50th hour, and the temperatures of those which had shown an elevation had fallen about one degree F. Vesicles due to systemic infection appeared in four of them on the eighth day after inoculation; one was killed on the third day, too early for them to appear, another on the eighth day and the remaining one on the tenth day. Neither of the last two showed vesicles except at site of inoculation.

All of the six animals that received the virus passed through a guinea pig from fresh vesicles, soon after it was collected, showed swelling and reddening of site of inoculation at the 19th hour after inoculation, with temperature ranging from 103.6° F.

to 105.0° F. At the 24th hour, the swelling had increased and the temperature had risen slightly, ranging from 104.0° F. to 105.4° F. At the 50th hour, vesicles had either formed or were forming at the sites of inoculation and the temperature had dropped either to normal or near to it. Vesicles due to systemic infection appeared in three of the animals on the sixth day after inoculation, followed by additional vesicles in two on the seventh day. Of the three remaining animals, one showed vesicles on the seventh day, one on the eighth day, and one failed to show other than the inoculation vesicle.

The inoculation vesicles and those that appeared later usually healed in about seven days. When first formed they contain clear, watery fluid. The vesicles do not rupture, but the fluid soon disappears and the loosened skin remains moist for several days, but finally dries up into a hard, protective scab.

Intra-abdominal Injections

Group IV

February 15, 1926, guinea pigs 91949 to 91954 were each injected intra-abdominally with 1 cc of diluted emulsion of epithelium from a freshly-broken vesicle from the tongue of calf 1287, two hours after the virus was collected. This was the same lot of emulsion as used in making the cutaneous inoculations of the second group of guinea pigs discussed above, but was diluted to about one-fourth strength with 0.85 per cent salt solution. Lesions developed as follows:

G. P. 91949. 5th day after injection, temperature 100.0° F., vesicles appear to be forming on right front foot. Not observed on the sixth day, but on the seventh very large vesicles were present on both fore feet, both metatarsal pads and one hind foot. The animal was killed five days later, at which time the loosened skin covering the above lesions was still moist; healing was progressing beneath.

G. P. 91950. No lesions developed.

G. P. 91951. No lesions developed.

G. P. 91952. 7th day after injection, vesicles forming right fore foot. 8th day, large vesicle right fore and right hind foot. 9th day, vesicle on right hind foot extends to metatarsal pad, new vesicle left matatarsal pad. The animal was killed on the twelfth day after inoculation, when the lesions, excepting one that had become infected, were healing.

G. P. 91953. No lesions developed.

G. P. 91954. 7th day, vesicles forming both fore feet and one hind one. 8th day, large vesicles all four feet. Killed two days later. Lesions beginning to heal.

Three of this group of guinea pigs developed lesions in from seven to eight days and three failed entirely. This does not compare favorably with the cutaneous method of inoculation, in

which the same virus caused inoculation vesicles in all, and other vesicles in four. However, when a larger dose of virus was used, all of the animals became infected as in the case of the six guinea pigs injected with diluted vesicular fluid, already described.

A considerable number of tests, in addition to those recorded, indicate that the intra-abdominal method of inoculation is not so certain as the cutaneous.

Group V

On February 15, 1926, six guinea pigs (Nos. 91943 to 91948) were each injected subcutaneously under the narrow strip of hairless skin immediately at the side of the right metatarsal pad, using the emulsion of epithelium from tongue vesicle of calf 1287. This was part of the same material used in the preceding lots of guinea pigs but had been filtered through filter paper. One to two drops were injected. Lesions developed in these guinea pigs as follows:

G. P. 91943. 19 hours after injection, temperature 104.6° F., slight swelling at site of injection. 24 hours later, temperature 102.6° F., still slight swelling at site of injection. 4th day after injection, swelling disappeared, no visible signs of vesicles, temperature 104.4° F. 24 hours later, vesicles both fore feet and right hind one. Killed four hours later. Skin loosened over entire plantar surfaces of both fore feet. Only a small amount of clear fluid present. Tissue under the loosened skin very red and raw. The skin is loosened over the entire surface of the right metatarsal pad. About one drop of clear, watery fluid present in the vesicle thus formed. Anterior half of dorsal surface of tongue denuded of epithelium.

G. P. 91944. 19th hour after injection, temperature 104.6° F., little swelling at site of injection. 24 hours later, temperature had dropped to normal and swelling had disappeared. On the fourth day temperature was normal and there were no lesions visible. On the 5th day large vesicles were present on both fore feet and left metatarsal pad but none on the right one. Killed on tenth day. Autopsy: Skin loosened but unruptured over entire plantar surfaces of both fore feet and left metatarsal pad; no fluid present; underlying tissue beginning to heal.

G. P. 91945. 19 hours after injection, temperature 103.8° F. No swelling at site of injection. No lesions developed.

G. P. 91946. 19 hours after injection, temperature 103.0° F., little swelling at site of injection. 24 hours later, swelling slightly increased, temperature 102.6° F. 5th day after injection, right hind foot swollen and sensitive. On the eighth day there was a large vesicle on the right fore foot, another on the right hind foot and one on metatarsal pad. Temperature normal.

G. P. 91947. 19 hours after injection. temperature 104.0° F., slight swelling at site of injection. 24 hours later, temperature 102.2° F., swelling about the same. 4th day after injection, no lesions, temperature 101.6° F. 8th day, large well-distended vesicle right metatarsal pad and also on left hind foot. Killed on tenth day after injection. Loosened but unruptured skin still covered sites of vesicles but no fluid present; lesions healing.

G. P. 91948. 19th hour, temperature 104.0° F., very little swelling at site of injection. 24 hours later, temperature 101.8° F., swelling had disappeared. On 4th day, temperature 101.6° F., no lesions. On the 5th day, a vesicle had developed at side of right metatarsal pad, site of inoculation; tempera-

ture 102.6° F. On the 8th day, vesicle had extended over entire metatarsal pad and contains several drops of clear, watery fluid; temperature 102.0°F.

The five positive guinea pigs of the above group developed vesicles in from 5 to 8 days after injection but there were no true inoculation vesicles as in the animals inoculated by scarification on hairless portions of the skin, though there was the same early rise in temperature. The injections were followed by slight swellings which soon disappeared. Though vesicles appeared at or near sites of injection, in four of the animals, they did so simultaneously with the systemic manifestation of the infection and may be regarded as part of it. These are the only guinea pigs that we have injected in this manner. A limited number were injected subcutaneously inside of the thigh with negative results; further trials might, however, have been more successful. All of the lesions in guinea pigs were confined to the tongue and hairless portions of the skin.

Discussion

The work represented by the foregoing examples shows that at least one strain of vesicular stomatitis can be transmitted to guinea pigs by inoculation. If the inoculation is made by scarifying the metatarsal pad with an ordinary sewing-needle and rubbing the virus into the wounded surface with a small pledget of cotton, the site of inoculation becomes swollen and reddened in from 19 to 24 hours, or even less, and the temperature at this time usually shows a decided elevation, frequently reaching 105.0° F. or more, the normal temperature being about 101.6° F. A well-marked inoculation vesicle appears in all positive cases in from 44 to 50 hours after inoculation. Usually the temperature drops to normal or near to it when the vesicle has made its appearance. The inoculation vesicle is usually followed on the fifth to the eleventh day, but more commonly on the seventh or eighth day, after inoculation, by other vesicles which may appear on the plantar surface of one or more feet and the opposite metatarsal pad, and occasionally on the tongue, especially its tip. We have not as yet observed lesions on the lips. The vesicles often extend over the entire plantar surface of the foot and sometimes involve one or more toes. The metatarsal pad seems to be a favorite site for vesicles and when affected the entire surface usually is involved. Though the vesicles on the tongue rupture, leaving eroded surfaces, those on the feet and metatarsal pads seldom do. When first formed they contain clear, watery fluid, but this soon disappears. If the loosened skin is dissected away

from a newly-formed vesicle, the underlying structures will be found to be very raw. Healing, however, soon begins under the loosened skin which remains moist for a few days, but eventually forms a dry protecting scab. Complete healing usually occurs in a week to ten days.

In some of the guinea pigs there seemed to be a decided systemic reaction, shown by lack of appetite and a disposition to remain quiet while the vesicles were forming and for a day or two after they had made their appearance.

The disease caused by intra-abdominal injections ran about the same course as that caused by cutaneous inoculations, except for the absence of inoculation vesicles. The appearance of vesicles may begin as early as the fourth, but usually on the sixth or seventh, and may be delayed until the tenth or eleventh day.

Results obtained with one small group of guinea pigs indicate that subcutaneous inoculations made under the hairless skin at the side of the metatarsal pad cause about the same manifestation of the disease as intra-abdominal injections. That is, there is no inoculation vesicle.

The cutaneous method on hairless portions of the skin seems to be the most certain one of producing the disease in guinea pigs. With fairly fresh virus nearly all those inoculated will usually show at least inoculation disease; whereas the same virus will infect only about half of them if given intra-abdominally, unless doses are large. The cutaneous method also has the advantage that a diagnosis can be made on the appearance of the inoculation vesicle on the second day without waiting until the fifth day, or longer, for the systemic manifestation, as would be the case were the intra-abdominal or subcutaneous methods used.

While our work is as yet incomplete, it has gone far enough to show that the lesions caused by one strain of vesicular stomatitis are so similar to those described by Waldmann and Pape as occurring in guinea pigs inoculated with foot-and-mouth disease virus, that it would be difficult, if not impossible, to differentiate between them. The appearance of the inoculation and other vesicles, the failure of the vesicles to rupture, and the character of the vesicular fluid all seem to be very much the same in both diseases. The vesicles were not quite so prompt in appearing in our animals as in those of Waldmann and Pape, but these investigators found that when the weaker strains of foot-and-mouth disease virus were used, the time of the appearance of

the inoculation vesicles was lengthened and the other ones might not appear.

We have attempted to pass the virus of vesicular stomatitis through a series of guinea pigs but until lately have not succeeded in passing it beyond the second animal. The failure was likely due to not collecting the virus at an early enough stage of the disease. Experiments now in progress seem more promising. Waldmann and Pape succeeded in passing the virus of foot-and-mouth disease through a series of 95 guinea pigs without being able to conclude that this affected its virulence.[4] We found that, after a single passage through a guinea pig, the virus of vesicular stomatitis produced severe disease in a cow.

A limited number of exposures of guinea pigs to vesicular stomatitis through feeding and by direct contact with other guinea pigs affected with the disease were negative. Waldmann and Pape were unable to communicate foot-and-mouth disease to guinea pigs by either of these methods.

It was hoped that some difference in the behavior of the guinea pig toward the two diseases could be found, but up to the present we have observed nothing that is reasonably serviceable in making a differential diagnosis.

Presence of the Virus of Vesicular Stomatitis in the Blood of Horses and Cattle

We have made use of the intra-abdominal injection of guinea pigs to determine the presence of the virus of vesciular stomatitis in the blood of horses and cattle affected with the disease. Three cubic centimeters of the freshly-drawn blood were injected in each case, this being about the maximum amount of bovine blood that can safely be injected into guinea pigs. Samples of blood from two horses and seven bovine animals were tested in this manner. All of these animals were infected with the disease by inoculation on tongue and lip. Records of these animals follow:

Horse 192. Six guinea pigs injected with blood 47 hours after inoculation, at which time vesicles had formed on the tongue and were ready to break. One of these guinea pigs developed vesicles on the eighth day after injection and the balance were negative.

Horse 263. Six guinea pigs injected with blood drawn 24 hours after inoculation, at which time the horse's temperature was 104.0° F., but there was no evidence of vesicles. One of the guinea pigs developed vesicles on the eighth day, but the balance were negative. Six guinea pigs injected with blood drawn the next morning, at which time vesicles had formed and ruptured, and six injected with blood drawn on the afternoon of the day following were all negative.

Cow 1155. Six guinea pigs injected with blood drawn 44 hours after inoculation, when temperature was 104.0° F. and vesicles on tongue had just ruptured, were all negative.

Cow 1174. Blood drawn 24 hours after inoculation, when temperature was 104.8° F., caused vesicles to develop in two of three guinea pigs that survived long enough for them to appear. Blood drawn 42 hours after inoculation, when vesicles had formed, caused lesions to appear in one of three guinea pigs that survived long enough for them to develop. The vesicles appeared on all four feet of this guinea pig on the tenth day after it was injected.

Yearling bull 1258. Temperature 22 hours after inoculation, 107.0° F. Blood drawn 42 hours after inoculation, when temperature was 104.8° F., and vesicles had formed and were about ready to rupture, caused lesions in two of the six guinea pigs injected with it. Blood drawn six hours later, when the temperature was 104-4° F., and the vesicles had ruptured, caused marked lesions in one of six guinea pigs, the vesicles appearing on the tenth day. Blood drawn 66 hours after inoculation, when an additional vesicle had formed and broken, failed to produce lesions in any of the six guinea pigs injected.

Cow 937. The temperature of this cow was 106.0° F., 22 hours after inoculation; 107.0° F., one and two hours later and dropped to 105.0° F. at the 25th hour after inoculation, when a vesicle was just beginning to form. Blood drawn 24 hours after inoculation caused well-marked vesicles to appear in eight of the twelve guinea pigs injected, in from eight to eleven days. Blood drawn from the cow 26 hours after she was inoculated caused lesions in two of six guinea pigs injected with it in eleven days; blood drawn at the 48th hour, about five hours after the vesicles on her tongue had ruptured, caused lesions in three of six guinea pigs injected with it in from seven to twelve days; and blood drawn at the 66th hour caused lesions in one of six in ten days. Fresh vesicles appeared in the mouth of the cow on the fifth day following the rupture of the first ones.

Cow 1146. Blood drawn 44 hours after inoculation, when the temperature was 102.6° F. and one large vesicle on the tongue had ruptured and another was fully formed, caused lesions in four of six guinea pigs in from eight to fifteen days. There was little elevation in the temperature of this cow at any time.

Cow 1226. Blood drawn 24 hours after inoculation, when the temperature was 106.4° F. and vesicles were just beginning to form on the tongue, caused well-marked lesions in three of six guinea pigs on the eleventh day after injection. Blood drawn 43 hours after inoculation, when the temperature was 104.0° F. and a very large, well-filled vesicle was present on the tongue, caused lesions to appear on the tenth day in one of six guinea pigs injected.

It will be seen from the above tests that the virus of vesicular stomatitis appears in the blood of horses and cattle within 24 hours after local inoculation, and that it remains a short time after the vesicles have fully formed and ruptured. At just what time it has entirely disappeared has not been determined, but the reduced proportion of positive guinea pigs injected before indicates that the infection does not remain for long. Cow 937 is not a typical case, though cases of this kind are not uncommon. Since the disease in her was so long drawn out, it was to be expected that her blood would remain infected for a longer time than usual.

Attempts to Isolate the Etiological Factor

Considerable work has been done and is still in progress in attempts to isolate the causal agent of the disease. Various standard and several special media have been tried under aerobic and anaerobic conditions and also in an atmosphere containing a considerable percentage of carbon dioxid. Culture media have been inoculated from horses, cattle and guinea pigs, but so far our efforts have been unsuccessful; either the media remained sterile or the organisms which grew would not produce the disease.

Several filtration experiments have been made and others are contemplated, but so far the results have been the same as those following the earlier work of the Bureau, viz: the virus failed to pass the filter.

Transmission of the Disease to Cattle by Natural Methods

Work is in progress to gain additional facts about the transmission of the disease. As far as this work has gone it appears that almost direct contact in the early stages of the disease is necessary to infect. We have been unsuccessful, with a limited number of animals, in attempts to transmit the disease by environmental exposure, or by direct exposure to diseased animals five days after the last vesicle had ruptured, but had no difficulty in doing so by direct exposure to animals during the early stages of the disease. Records of these experiments follow:

Direct Exposure During Early Stages of the Disease

On December 19, 1925, yearling bull 1258 was inoculated on the tongue with vesicular stomatitis virus. The following day the animal was placed in a stable, 14 x 16 feet in size, with cow 1230 and her month-old calf, yearling heifer 1284 and two pigs. The animals were allowed the run of the stable in order to give close contact. Three hours after the animals were placed together, the temperature of the inoculated animal was 107.2° F., and the next morning vesicles had formed at sites of inoculation on the tongue and were about ready to rupture, which they did in the afternoon, at which time a fresh one was found to be forming around an abrasion that had accidentally been made on the upper lip. On the following day epithelium had sloughed away from vesicles on tongue leaving about one-third of the

dorsal surface of that organ very raw. The vesicle on the upper lip had ruptured. The animal was slobbering quite a little.

On December 23 (fourth day after inoculation) erosions on both tongue and lips were quite large. They were coated with grayish exudate. The animal was slobbering a good deal and smacking lips. The animal continued to slobber and was still doing so on December 26, the seventh day after inoculation, when it was removed from the stable and used to give exposure to other animals. At this time the erosions were well glazed over, but a little manipulation started the tongue lesion bleeding.

Exposed yearling heifer 1284 developed a vesicle on the lip on December 27, or seven days after being placed in contact with the inoculated animal, and six days after the rupture of vesicles. Large vesicles appeared on both sides of the tongue a few days later. Cow 1230 and calf, and the two pigs did not develop lesions though they received exposure from the inoculated yearling and also from heifer 1284.

Yearling bull 1258, that was used to give exposure to the above animals, was removed from association with them on December 26 (5 days after rupture of vesicles on the tongue) and at once placed in another stable of the same size and allowed to run free with cow 1176 and yearling heifer 1286, for 14 days, without the exposed animals showing lesions. A cow which developed the disease three days previously was then placed with them. Two days after this had been done, fresh vesicles developed in her mouth. Four days later vesicles appeared in the mouth of heifer 1286. Three days following this the temperature of cow 1176 was 106.4° F. The next day it had dropped to 105.0° F. and on the day following a vesicle had formed on the upper lip.

Though a very limited number of animals were used in the above experiment, it shows that the disease can be communicated by direct contact during its early stages, but indicates that an affected animal is capable of communicating the disease by contact for a few days only after the rupturing of the vesicles. This is in harmony with field observations and earlier work done by the Bureau.

Environmental Exposure

On January 21, 1926, cows 937 and 1176 and yearling heifer 1286 were removed from the stable which they had occupied while affected with the disease; this was ten days after fresh

vesicles had appeared in the mouth of cow 937; six days after the onset of the disease in heifer 1286, and one day after in cow 1176. Therefore active virus was probably being spread about the stable for a period of ten days immediately prior to the removal of the animals. Notwithstanding this, cow 1103 and her nursing calf and yearling bull 1288, that were placed in the stable 24 hours later in contact with left-over hay and manure that had been allowed to accumulate for a number of days, failed to contract the disease though they were kept in the stable under observation for 21 days.

On January 20, 1926, yearling heifer 1287 was placed in a stall that had been occupied by cow 1146 while she was suffering from an attack of the disease. This cow was inoculated on January 13 by scarification on the tongue with virus taken from a guinea pig and developed a very severe form of the disease accompanied by much slobbering and smacking of lips. The slobbering and smacking of lips continued up to the time of her removal from the stall, and hay and mill feed which she had failed to eat were thoroughly sprinkled with particles of saliva worked into foam by the more or less continuous movements of her jaws. Heifer 1287 was tied in the stall in the same position that the cow had been, immediately after her removal, and consumed the saliva-soiled hay and feed. Much of the former had been in the manger throughout the attack. She remained in the stall for 21 days and developed no lesions; later she was inoculated with virus and developed characteristic lesions of the disease.

On February 17, 1926, cow 1185 was placed in a stall that had been occupied by infected heifer 1287 during the early stages of disease. The disease had been induced in the heifer by local inoculation on the tongue, made February 13. Large vesicles had formed and ruptured at and near site of inoculation 42 hours later. Fifty-there hours after the vesicles had ruptured, the animal was removed and cow 1185 immediately tied in the uncleaned stall in the same position that the infected heifer had been in, and allowed to consume the hay and mill feed that the latter had failed to eat and over which she had slobbered. A part of the mill feed was still moist with saliva when the exposure was made. Though cow 1185 was kept in the stall and under observation for 24 days, no disease developed. She was then inoculated by scarification on the tongue with fresh virus and developed very large vesicles at and near site of inocu-

lation, but they appeared about 24 hours later than is usual in locally inoculated animals. Fragments of epithelium collected from one of the freshly-ruptured vesicles on the tongue of the heifer giving the exposure, and kept for 19 days in the ice-box, were proved to be infectious for a cow by inoculation.

From the above two cases it would appear that not only does the virus soon disappear from the mouth but that, under natural conditions, it quickly dies after it leaves the animal. We have, however, kept epithelium from tongue vesicles in a test-tube, sealed with paraffin, for 30 days and found it still capable of causing disease on inoculation.

Immunity

Several animals that had an attack of the disease, induced by inoculation, were reinoculated to test their immunity as follows:

Cow 1174. Disease developed, July 25, 1925. She was reinoculated, January 20, 1926, or nearly five months later, and again on January 26 and 30 and February 15 but failed to develop a second attack of the disease.

Cow. 1209. Disease developed, June 19, 1925. She was reinoculated January 20, 1926, or seven months later, and again on January 26 and 30. No lesions developed from the first two, but the third was followed by well-marked disease, but the vesicles were about a day late in appearing. It has been our experience that susceptible horses and cattle, when inoculated by scarification on the tongue with virulent virus, in nearly every instance develop vesicles which are about ready to rupture by the 42nd hour after inoculation. Inoculation on the lip does not seem to be nearly so certain.

Cow 1155. Disease developed, July 4, 1925. Reinoculated, February 15, 1926, or nearly seven and a half months later. Result, negative.

Yearling bull 1225. Disease developed, January 28, 1925. Reinoculated, December 12, or ten and a half months later, and again on December 16. Both of the inoculations failed to produce disease but a third one, made January 6, 1926, resulted in the development of well-marked lesions, but they were about six hours late in appearing.

Horse 242. Disease developed, January 28, 1925. Reinoculated, July 3, or about five months later. Result, negative.

Horse 243. Disease developed, January 30, 1925. Reinoculated, January 20, 26, and 30 and February 15, 1926. No disease developed.

Horse 189. Disease developed, March 14, 1917. Reinoculated, March 16, 1926, or nine years later. Typical lesions developed in 42 hours.

Cow 518. Disease developed, March 22, 1917, at which time the animal was two years old. Reinoculated, March 16, 1926, or nine years later. Very marked and typical lesions developed in 42 hours.

The disease from which horses 189, 242 and 243, cow 518 and bull 1225 had recovered was induced by a different strain from that with which they were reinoculated. The remainder of the animals were reinoculated with the same strain as that which induced the disease from which they had recovered.

All of the virus used to reinoculate the above animals, with the exception of that used on bull 1225 on Dec. 16 and that used on horse 243 and cows 1174 and 1209 on Jan. 26, was

proved to be virulent. The virus used on January 26, though not tested on other animals, was probably virulent as it was collected from fresh vesicles and used at once. The virus used on bull 1225 on December 16 had been kept in the ice-box for almost a month and hence there is a doubt as to its virulence.

The above tests go to confirm the observations and earlier work of the Bureau and to show that the immunity induced by one attack is more lasting than had then been proved but that it is not permanent. In some of the cattle it was possible to break it down. One horse resisted four successive inoculations with virulent material a year after recovery and one cow the same number five months after, but the horse and cow that were reinoculated nine years after they had passed through an attack of the disease seemed to have no immunity. The immunity induced by an attack of the disease seems to be a real one, and in view of the fact that several very severe exposures were required to break it down in any of the animals, it should be sufficient to protect recovered animals against natural exposure to so mildly a contagious disease for many months, even though it does not do so for a considerable number of years.

General Conclusions

The foregoing studies and observations seem to warrant the following conclusions:

1. Vesicular stomatitis is often very difficult to differentiate from foot-and-mouth disease, by examination of the lesions alone.

2. Lesions indistinguishable from those of foot-and-mouth disease do sometimes occur on the feet of cattle.

3. Guinea pigs can not be used as an aid to distinguish the two diseases from each other, since they seem to react so nearly alike to both.

4. Unless some other test animal can be found, our main dependence must be placed in the horse, which seems to be highly resistant if not altogether immune to foot-and-mouth disease and very susceptible, by inoculation on the tongue, to vesicular stomatitis.

5. Though the virus can be kept for at least a month in a moist state and unexposed to the light, in the ice-box, it seems to die very quickly under natural conditions.

6. Actual contact with an affected animal in the early stages of the disease seems to be necessary to transmit it.

7. A real and fairly lasting immunity seems to be produced by an attack of the disease.

Though the lesions of vesicular stomatitis in cattle and guinea pigs are so much like those of foot-and-mouth disease, the two diseases are so dissimilar in contagiousness and the immunity they produce, that they may be said in the latter respects to be at the opposite ends of the scale.

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I wish to acknowledge help received from Dr. A. B. Crawford, assistant at the Experimental Station, for work done in connection with attempts to isolate the infectious agent and with filtration experiments; and also from Dr. W. S. Gochenour, of the Pathological Division, for assistance in the latter.

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[1]Waldmann & Pape: Berl. Tierärzt. Wchnschr., xxxvi (1920), 29, p. 519.
[2]Waldmann & Pape: Berl. Tierärzt. Wchnschr., xxxvii (1921), 30, p. 349.
[3]Hobmaier: Deut. Med. Wochnschr., xlvii (1921), 22, p. 616.
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BUREAU TRANSFERS

The death of Dr. W. N. Neil, B. A. I. inspector-in-charge, Chicago, Ill., was followed by a number of important transfers of B. A. I. veterinarians. Dr. H. Busman (Ont. '95), of Omaha, was transferred to Chicago. Dr. J. S. Jenison (McK. '07), of National Stock Yards, goes to Omaha. Dr. C. F. Payne, of Denver, has been moved to National Stock Yards. Dr. T. A. Shipley (Chi. '90), of Sioux City, goes to the Denver station. Dr. A. E. Behnke (Chi. '94), of Milwaukee, takes the Sioux City post. Dr. A. F. Staub (McK. '08), of New Orleans, has been transferred to Milwaukee. Dr. G. T. Cole (U. P. '02), of Atlanta, takes charge of the New Orleans station. Dr. E. Norton Tierney (Chi. '11), of Leavenworth, Kans., is now in charge at Atlanta. Dr. C. F. Pinkham (K. C. V. C. '09), of the Kansas City force, goes to Leavenworth, Kans.

Other changes include the transfer of Dr. E. H. Baumann (O. S. U. '04), from Albany to Jersey City. Dr. G. H. Woolfolk (K. C. V. C. '06), of Pottsville, Pa., goes to Albany. Dr. G. E. Repp, of Wilmington, Del., takes charge at Pottsville. Dr. T. J. Kean (U. P. '90), of Jersey City, has been transferred to Wilmington, Del. Dr. A. J. Maloney (Corn. '06), of National Stock Yards, takes charge at Phoenix, Arizona. Dr. Julius Huelsen (Amer. V. C. '92), supervising inspector of the New York City force, is now in charge at Paterson, N. J.

TRIFOLIOSIS*

By C. A. NELSON, *Brainerd, Minn.*

The common name of trifoliosis is clover disease and it occurs in horses, cattle, swine and sheep. Up to a little over a year ago, the writer has constantly and consistently failed to diagnose each and every case encountered, not having been able to connect, even remotely, any case with the ingestion of clover. These failures stimulated a little study of this disease, which in turn prompted the writing of this paper.

Trifoliosis is not thought to be very common on this continent, but it is believed that it is very much more common than we know of and it should be of importance to possess some information regarding this disease. Very little is to be learned from our textbooks, but a great deal is recorded in current European literature, which is not available to many without translation. Some short abstracts from a Swedish veterinary journal, *Tidskrift Svensk Veterinar*, will be offered in this paper as a basis for the etiology of a group of so-called light diseases, of which trifoliosis is one.

The authors, Walter Hausmann and Emil Gluck, state that a number of diseases have been known for a long time, which occurred in animals only under the influence of light, and that practical knowledge was available long before the etiology was known.

These diseases are termed optical sensitizations and the first recorded knowledge, of what was then termed photochemical catalysis, is accorded to F. W. Vogel who, in 1873, made the discovery that certain substances, by the addition of certain coloring material, are made sensitive to light of certain wavelengths, to which, by themselves they would be only slightly sensitive. This discovery was made on silver haloids, which led to the production of orthochromic light-sensitive plates.

Biologically, it is especially interesting to know that optical sensitization, through coloring matter, is very common in living animals under physiological as well as pathological conditions. Under the subtitle of biological, light-catalytic processes or photodynamic symptoms, the authors describe a number of experiments, whereby living animals were sensitized to light by

*Presented at the twenty-ninth annual meeting of the Minnesota State Veterinary Medical Association, Minneapolis, Minn., January 15, 1926.

administration of fluorescent coloring material. This material is known to exist in large quantities in nature in the form of chlorophyll and hematoporphyrin (hematin deprived of iron). Among artificial products only eosin, methylene blue and acridin are mentioned. All these substances have the same property of making animals sensitive to light and they are called photobiological sensitizers.

Hausmann experimented with hematoporphyrin by injecting small quantities into white mice, which remained normal as long as they were not exposed to the influence of light, but, if exposed to light, they developed certain symptoms and died in from a few minutes to hours or days, depending upon the amount of hematoporphyrin injected and the intensity of the light to which they were exposed.

This experimental disease was classified as acute, subacute and chronic and was called "light-stroke," in cases of very rapid death. The different stages of the disease, according to symptoms, are very minutely described and very interesting, but not deemed to be within the scope of this paper.

The different stages of this disease, so to speak, were produced to order, according to the quantity injected and the regulation of the exposure to light. It was especially noted that if in the beginning of the induced symptoms, before the disease progressed too far, the mice were again placed in the darkness, the symptoms would suddenly disappear. Mention is made of a German physician, Frederick Meyer-Betz, who has since died. In the World War, he had heroically experimented on himself, for the study of the effect of hematoporphyrin on man under exposure to light. The acute and subacute symptoms were experienced by himself analogically the same as in the experiment mice and although he exposed himself only slightly to light, it was only by placing himself in complete darkness that the symptoms were averted, which otherwise very likely would have caused his death.

These experiments are further substantiated by practical cases of what the authors designate as fagopyrism (from the botanical name of the buckwheat plant—*Fagopyrum esculentum*), or buckwheat disease. This disease is better known and furnishes a better example of light disease than clover disease.

Cases of fagopyrism have been reported in both agricultural and veterinary literature for a number of years. Farmers noted that animals feeding on buckwheat, seed or plant, and then exposed to sunlight, would develop typical symptoms, while

they would remain normal if kept in darkness. Only non-pigmented animals are attacked. Pigmented or dark-skinned animals are immune and in parti-colored animals it is localized in the non-pigmented areas. Even if the white skin is soiled by dust or mud, it affords a measure of protection against the rays of the sun. It seems that quite intensive light is required to bring out the disease. Animals which are out in the open on cloudy days are not exposed sufficiently to light to produce symptoms. Fagopyrism may be limited to very slight lesions of the skin, but it has also been known to cause death. Serious lesions are erysipelatous inflammation of the skin, which becomes red and swollen, affecting particularly the ear-muscles so that the ears hang down; vesicles appear with clear contents which, when evacuated by breaking, form moist spots; these dry and form crusts. During this process, there is great itching; animals shake their heads and rub on solid objects. Not infrequently there is a stage of excitement, when they run around, performing strange motions.

This sensitization to light continues for some time after the feeding of buckwheat ceases, so that fagopyrism occurred as late as three to four weeks after the last feeding, the animals in the meantime having occupied dark quarters and having been allowed to be out only on cloudy days. This condition is identical with experimental treatment with hematoporphyrin and exposure to light.

Experienced stockmen discontinue the feeding of buckwheat several weeks before turning the animals out to pasture; only by such precautions is prophylaxis possible.

A West Prussian stockman, M. Wedding, noted that the whiter the skin is, the more severe the disease. This man also smeared tar on one side of a white cow which was fed buckwheat. The white side became diseased, while the darkened side remained normal.

Glocke cites cases of fagopyrism in forty-eight lambs, which were stall-fed on buckwheat for four weeks. The disease appeared suddenly on a bright, warm day, after they had been out in the open eight days during the cloudy, inclement weather. There was extensive redness and swelling of the skin, especially around the ears, affecting the muscles so that the ears hung down; otherwise their general health was good. In this flock there were three black lambs, none of which showed any symptoms of the disease. This was considered a light form of fagopyrism. Klein describes

a more severe form, also in a flock of sheep, which, during several warm, bright days, were pastured in a field of buckwheat. In these cases there were red, painful swellings of the head; ears were entirely stiff; conjunctivae red, with edematous swelling; pustules also developed on the lips. There also was noted depression of the central nervous system, evidenced by reeling of the hind parts, falling down and spasms over the whole body. No animals died

Other experiments of feeding buckwheat to white rabbits and exposing them to Finsen light are also recorded by Hausmann. In these experiments he produced some typical symptoms. Control rabbits, fed buckwheat and not exposed to light, did not develop this disease. The coloring matter in the buckwheat, responsible for this disease, is soluble in alcohol. Buckwheat treated with alcohol was fed to white mice, guinea pigs and rabbits, which were afterwards exposed to light without contracting the disease.

The alcoholic extract of buckwheat is fluorescent and if the residue, after evaporation in vacuum, is fed to white mice and they are afterward exposed to light, they die with paralytic symptoms. No cases of fagopyrism in man are recorded, although much buckwheat is consumed, both in Europe and America, which leads these authors to the conclusion that the active principle is most probably destroyed by cooking.

Trifoliosis is observed in horses with white markings less often than in cattle, sheep and swine, after eating Swedish clover (*Trifolium hybridum*). It is characterized by redness and swelling, more or less of the white skin, practically and essentially the same as above described in buckwheat disease. A number of cases are to be noted in European literature, but only the writer's own cases will be described.

Our experience with this disease began a number of years ago and was limited to horses with white markings, especially those having what are known as "bald faces," where there first appeared redness, followed by exudate, which dried to form scabs. The scabs dried and fell away, leaving no appreciable scars. This same process was also noted on the white skin of Holstein calves. None of the larger animals were affected and nothing serious having occurred, in the absence of any knowledge of light disease, it was thought to be ordinary sunburn. In June, 1924, the writer was summoned to see a cow which, according to the owner, was suffering from colic. This seemed to be true;

the animal would stamp her feet, lie down and get up frequently. Saliva dripped from the mouth. Temperature, 105° F. On closer examination it appeared that the skin, especially on the extremities, was swollen and then droplets of exudate appeared, reddish in color; in fact, she had the appearance of actually sweating blood. Some vesicles in the mouth were also noted.

To the writer, this all seemed to suggest hemorrhagic septicemia, especially of the cutaneous type, but being aware that some of our best pathologists were not agreed on the correctness of such a diagnosis, *per se*, we hesitated in committing ourselves to a definite diagnosis. At that time, the foot-and-mouth disease in California still kept us alert, and it was thought that there might be a possibility that this was a case of that dreaded disease. Consequently the State Live Stock Santiary Board was notified. The Board promptly sent a trained pathologist who, after viewing the case, at first agreed with the writer that it was a case of hemorrhagic septicemia, but after more mature consideration and consultation with Kinsley, it was quite definitely determined that this was a case of trifoliosis. The description furnished by European writers fits this case in all particulars. This was a white-and-roan cow. On all white parts of the body there was redness, which changed to dark or bluish red and seemed to involve the hair follicles. There was also some swelling, painful in character, but if there was itching, we did not observe it. Later the exudate dried and formed hard crusts over extensive areas, giving the animal the appearance of having been in a fire. After several weeks, these crusts fell away, leaving considerable scars where the crusts had been thickest. It may be that a great deal of this could have been prevented, had we known about the influence of light; as we did not know, the animal was turned out in the sunlight as soon as she was able to get around.

The Swedish authors, referred to above, described very similar cases, some of which were ascribed to clover, others to a variety of other leguminous plants among which field-peas may be mentioned. In Italy, *Hypericum crispum* is said even to cause death in sheep to such an extent that only black sheep are raised. Wyman is quoted as reporting some localities in Florida where only black swine were raised, as white pigs, eating a root (*Lachnantis*) developed a disease in which their hoofs sloughed away and which also would produce lesions of the bones. Black pigs were not affected. It is also thought probable that light plays

an important rôle in many other diseases, such as rachitis, pellagra and scorbutic troubles. Rape blister in white hogs, on rape pasture, is undoubtedly in this group.

In conclusion, it may be stated that no effort has been made to cover the subject, but it is hoped that these abstracts, together with the case report, may stimulate further study.

PUTTING IT UP TO THE DOGS

"Every dog shall have his day" has always been a comforting thought and Friday afternoon at the Johnson County Health rooms, Court House, all dogs in and around Paintsville who desire to have the anti-rabic vaccine administered are to be on hand with their owners. This treatment will insure all dogs against rabies for one year and they will be permitted to go without their muzzles or leashes. The cost of the vaccine will be seventy-five cents for small dogs and double the amount for large dogs.

Paintsville, Ky., *Herald.*

ON THE WAY TO LEXINGTON

Black root rot, resistant and non-resistant, burley tobacco.

ADVANCEMENT IN ANIMAL INDUSTRY*

By Wm. Herbert Lowe, *Paterson, N. J.*

It seems very fitting and proper that the Veterinary Medical Association of New Jersey should convene here at this time in conjunction with the annual conference for veterinarians under the auspices of the State College of Agriculture.

We are all proud of old Rutgers with her glorious history; with her invaluable traditions of great and noble colonial days; with her enviable record in the fulfillment of her obligations, since the time of Abraham Lincoln, as the New Jersey unit of the land grant colleges of the United States; and now in these latter days as the State University of New Jersey, where greater and greater provision is being made for research and for education.

It is highly gratifying to the members of the veterinary profession to be privileged to meet in such a splendid and capacious auditorium as this; and to witness the facilities and equipment of this new modern and model dairy and animal husbandry building recently erected by the state of New Jersey. The veterinary profession appreciates keenly the hearty welcome and cordial reception accorded us here today by distinguished leaders in agricultural progress. May our deliberations and discussions be productive of much benefit to the veterinary profession and to scientific agriculture.

It is not my purpose on this occasion to attempt to recount the various steps of advancement in the animal industry, wonderful and extraordinary as they have been, since the intelligent application of scientific principles has been made to this industry; nor to elaborate upon the economic and public health aspects of the problems involved; but rather to consider the subject *prospectively*, with a view not only of making the best possible utilization of the knowledge already acquired for the upbuilding of a still greater animal industry and a still greater agriculture; but one that shall be safeguarded from devastations of disease, one whose live stock shall possess a natural or acquired immunity to those dreadful scourges to which our flocks and herds are exposed.

*Presented at the forty-second annual meeting of the Veterinary Medical Association of New Jersey, at the State College of Agriculture, Rutgers University, New Brunswick, N. J., January 26-27 1926.

No one attaches more importance to the great advancement that has been made in breeding, feeding and other branches of animal husbandry, in the control and extermination of disease, as well as in other directions, than I do, but these should not be regarded as fixed accomplishments but simply the beginning of a still greater advancement and a still greater animal husbandry. What has been accomplished is but an index to the possibilities that await further experimental work and research which will lift the industry to a more useful and a still higher plane.

There is no doubt but that the great science of preventive and sanitary medicine is rapidly approaching a degree of importance equal to, if not exceeding, that of the oldest branch of medical practice which is concerned with the cure or treatment of disease in animals already afflicted.

Greater Fields Beyond

The control and extermination of contagious and infectious diseases among our domesticated animals effected by such measures as segregation, quarantine, slaughter, sanitation and artificial immunization, is of incalculable value to the industry and, basing an opinion on the results of recent experimentation, demonstration and administration, we are justified in concluding that the administration of preventive and sanitary science will afford even greater and better service in the future than in the past.

Notwithstanding all this I believe there remains a wide field for experimental and practical endeavor to be projected along quite a different line that is worthy of our earnest consideration in the realm of applied science. That through the careful selection of breeding animals and the use of the forces of heredity there may be developed families of the several species, breeds and types of live stock, including poultry, that would possess inherent resistance and a natural or acquired immunity to disease. We should be propagating animals possessing a natural immunity as well as enforcing measures for the control and eradication of devastating diseases.

Animal breeding and management, with a view to immunization from infections and infestations, would have a vast economic importance. The cost of eradication of contagious and infectious diseases would not have to be taken into account if such diseases did not exist. While this may be considered an ideal condition not wholly possible of attainment, yet there can be no doubt

but that we are constantly breeding parasitic and infectious diseases in and with our domestic animals which would not occur at all if a practical application were made of available scientific knowledge.

I feel that this field of investigation would open up a new vista of usefulness and value which, in comparison with past accomplishments, wonderful as they have been, would sink into insignificance.

Domestication of live stock and poultry; the development of breeds; the development of various types of the same breed; breeding for productivity; for early maturity; and the establishment of the advanced registry for dairy cattle are notable accomplishments, but it is right here that we must not lose sight of the fact that artificial conditions, refinement in breeding and feeding, and driving the animal machine at a high rate of speed, taxing every organ and function to its utmost, as in the case of the dairy cow, cannot be done without compensating ill effects. Nature's penalty may be sterility or disease, not infrequently entailing the sacrifice of perhaps the very best animals in a choice herd.

Develop Animals of Greater Resistance

Some of these factors have been potential in the widespread dissemination of tuberculosis in dairy cattle and if we would keep our breeding and dairy herds free from this disease more attention will have to be given to the laws of animal life and hygiene. Animals must be bred and developed with a greater degree of resistance to infection and a natural immunity to disease, otherwise they will not be able to withstand exposure to infection and much of the work of eradication will go for naught.

One of the most pressing needs, as I see it, in this state, at the present time, in connection with the safeguarding and advancement of animal husbandry, is for the establishment and maintenance of adequate veterinary laboratories supported by the State, at the College of Agriculture, for diagnostic service and for research work. The agitation of the New Jersey Guernsey Breeders' Association for a laboratory where agglutination tests of blood samples from dairy cows might be made for the purpose of having animals certified that were found free from contagious abortion is but an instance of the need of such laboratories. Not infrequently it is of great importance that a

diagnosis be promptly verified in the laboratory. Such a service would be welcomed by veterinary practitioners generally and would be of incalculable value to the live stock interests of the State.

Animal experimentation and research are essential factors in constructive work for the betterment of animal husbandry. Prevention is better than cure and natural immunity is to be preferred to artificial immunity. Science has abundantly demonstrated its ability to control infectious and parasitic diseases of live stock and we may confidently look forward to a time when the management of the animal industry in our state and nation will be so transformed that veterinarians will be retained by breeders and others to prevent rather than to cure disease.

The proposition I would venture to make here today is that the state be asked to provide laboratory and other facilities at the Experiment Station for the inauguration of a definite movement with the object in view of the development of a dairy, poultry and animal husbandry whose live stock shall possess an absolute inherent resistance when exposed to contagious or infectious diseases. I would stress the fact that utilizing the forces of heredity in the selection of breeding animals, families of the several species, breeds and types of live stock may be developed which would possess a natural immunity to communicable diseases which would be of paramount value to the animal industry.

HONORING DR. S. G. HENDREN

The Harrisburg (Pa.) *Evening News* recently honored Dr. S. G. Hendren (U. P. '94), of Lewistown, Pa., in the daily feature, "The Velvet Hammer," which, it is said, "strikes here and there in Pennsylvania." Accompanying Dr. Hendren's photo was the following:

> "The poet and the painter and the sculptor of his shape have done the horse in terms which make admiring masses gape. The jockey and the jehu and the gypsy in the dell have given sundry citizens a royal right to yell, while generals of cavalry, a sterling steed astride, have made the nations hold their breath and watch the horse they ride.
>
> "But here's the mender of his bones, the doctor of his ills, the man who stops the horse's groans with poultices and pills. He's been the friend of horses since he first could mount and ride; with army services was long inlisted and allied; was government inspector at New York's distinguished port, with other work of similiar and consequential sort.
>
> "He's signed himself from Lewistown for thirty years and more, his residence beginning back in 1894. His two large sons are fitted out with bachelor degrees—in Princeton and in Dickinson they got their bright A. B.'s. Their father spends much time with them and with the game and fish, and lives a life as plain and sane as wisdom well could wish."

Dr. Hendren, by the way, recently rounded out a quarter of a century of continuous membership in the A. V. M. A.

THE FARMER AND THE VETERINARIAN*

By R. R. Dykstra, *Dean, Division of Veterinary Medicine*
Kansas State Agricultural College, Manhattan, Kan.

The Past

The veterinary profession has passed through a most strenuous period. From our viewpoint no other profession has had so many obstacles simultaneously thrust in its pathway as that of the veterinarian. Permit me to mention a few of them.

The war: The influence of the World War was so immense that no human activities escaped its effects. It entirely disrupted normal human relationships. The veterinary profession, amongst others, could not hope to escape its ravages.

Before the war there had been a period of great and remunerative activity for veterinarians, so that the eyes of young men were turned longingly upon this profession. As a result of the war, a large number of practitioners were withdrawn from the fields of active practice, their practices as a result became disrupted, and when they were finally released from the federal service they found their former locations occupied by others.

During the early days of the war period, the number of graduates in veterinary medicine did not materially decrease, so that with the ending of war activities there was a sudden overabundance, or a flooding of the market with men of veterinary training. Such a state is never a healthy one, and in this case it worked immense hardship upon many of our professional brethren.

Mechanical motive power: Almost at the same time that the great war was punishing us, mechanical motive power received a terrific forward impulse. The general impression that animal motive power has been displaced to an equal extent that mechanical motive power has made its appearance is erroneous, of course, because there never were so many horses on our city streets as there now are automobiles. It is true, however, that mechanical motive power has made sufficient inroads upon the city veterinarian's practice to make the horse virtually a negligible factor. This is not by any means true to the same extent in the practice of the veterinarian in rural districts. Many city veterinarians affected by this transition were trained very largely

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as equine physicians. Many of them could not accommodate themselves to changed conditions. This left a large group of dissatisfied men in the veterinary ranks.

Agricultural depression: During the war period the farmer was encouraged to produce as much as possible. It was urged upon him as a patriotic war measure. In order to stimulate agricultural production the federal government practically guaranteed remunerative returns. No sooner was the war over than this federal guarantee was withdrawn, with the result that the farmer's markets slumped seriously, he was left with a surplus on his hands, produced by high-priced labor and during an era of high prices, which he must dispose of in a ruinously competitive market. Not only was he forced to compete with American farmers, but with those from foreign countries as well. The result was inevitable. Many farmers saw the savings of years literally wiped out before their eyes. The prices of live stock went down so rapidly that at times it was almost impossible to follow the market.

Is it peculiar that all of this should have a serious reaction upon veterinary activities? Veterinarians soon found that live stock owners, rather than employ a professionally trained person, would turn to all manner of expedients for relief from the ravage of disease, with the result that the veterinarian's income suffered correspondingly.

Public service agencies: During the period in question, and possibly as a sequel of the great war, many public service agencies were developed. It was at this time that the farm bureau movement received its greatest impetus. The county farm advisor arose on every hand. He was not clearly informed as to the exact nature of his duties, with the result that ill-advised enthusiasm to render service frequently led him to encroach upon the rightful prerogatives of the veterinarian. The veterinarian was the best trained agency in the field to deal with animal diseases, and so long as he occupied this position it was not constructive to take away a portion of his duties and place them in the hands of the poorly-prepared (from the veterinary standpoint) county farm advisor. It did not take very long for the latter, if they had been rendering veterinary service, to find out that they were getting into immense difficulties. During this period of adjustment many veterinarians felt this destructive influence.

Higher scholastic requirements: During the early periods of the

American live stock industry it was such a comparatively simple matter to produce live stock cheaply and profitably that very little attention was paid to animal health. As the American population increased, the public domain for free animal-grazing decreased and transportation costs increased, with the inevitable result that there was a sudden and intense demand for some form of veterinary service. Private and state veterinary schools sprang up on almost every hand, this in response to the demands of the live stock interests that a better veterinary service than that delivered by the empiric be developed.

Under the peculiar conditions existing at that time it was neither practical nor possible for the educational institutions to develop a highly trained veterinarian. The call of the times was for someone to assist the live stock owner in his greatest difficulties. The schools of that day supplied this demand in an admirable manner. The graduates of that day accredited themselves in a manner that was nothing short of marvelous.

The cost of live stock production, however, was constantly increasing. As a result of the introduction of purebred sires, higher priced herds were being developed and the demand of the live stock owner was constantly for a more scientifically trained veterinarian. This scientific training must needs have a solid foundation. The educators of twenty years ago faced the issue squarely, with the result that no one was eligible to enroll as a student in veterinary medicine unless he had completed a thorough course in the fundamentals, namely, a high school graduate or one having completed an equivalent course of instruction. These requirements limited the number of matriculants, undoubtedly unjustly so at times. A preliminary high school education is not an absolute guarantee that a young man can be developed into a successful veterinarian, but it is the most acceptable standard of the present day. Some careful students of veterinary affairs have stated with a good deal of merit that the reduced enrollment in our colleges was a blessing in disguise, and that if the same production of veterinarians had continued as before the war, it would have left an extremely unprofitable field for eveyone interested in animal health. Unfortunately, the situation has swung to the other extreme so that even now it is only with the greatest difficulty that properly qualified veterinarians can be obtained for certain specialized veterinary vocations. Undoubtedly, as a shortage of veter-

inarians becomes more apparent, the colleges will again have larger enrollments.

The Present

Complete and satisfactory orientation of all the forces concerned in the production, financing and protection against the assaults of disease has not yet been found, but the light is beginning to show.

It has been conclusively proven during our period of stress that, from the financial standpoint, the veterinarian stands or falls with agriculture in general. A prosperous agriculture, and especially the animal husbandry section of it, means prosperity for the veterinarian.

The veterinary profession has not been entirely blameless in its attitude. Its judgment has at times been warped by self-interest, though it must be said to the everlasting credit of the profession that in the larger measure for live stock welfare it has risen above petty and personal interests and wholeheartedly lent its enthusiastic support. In the days when the eradication and control of tuberculosis was first broached, and state and federal forces were appearing in the practitioner's territory, did he become an obstructionist? He did not, and almost invariably spent of his own time, energy and money to advance a theoretically-sound plan.

There were some among us who did not fully grasp the purpose of those state legal enactments that limited the activities of all those except the fully qualified to practice veterinary medicine. There seemed to be an impression, and at times it was so stated, that these laws were passed for the purpose of entrenching the veterinarians in what some considered their rightful prerogatives. Nothing is of course farther from the truth. The laws in question were passed because virtually all states value their live stock industry. They did not want this industry tampered with by the professionally incompetent, and therefore veterinary enactments were approved for the protection of the live stock interests. The significance of this is that veterinarians must prove themselves to be of genuine value; if they do not, the state in its supreme authority will turn to other means of protection. It is only so long as we continue to demonstrate our superiority as animal physicians and sanitarians that the state will protect us in our efforts.

At the present time, unsettled conditions as a result of the

war are disappearing so rapidly that we will soon reach the point where this influence may be discounted. Those veterinarians suddenly thrown back upon their own resources, after a period in the United States Army, have succeeded in finally again making themselves serviceable units of their respective communities. It is encouraging to note that some of these men have actually developed sentiment in their favor so that though locating in communities where no demand seemed to exist for veterinary services, they have by their strength of character and professional qualifications made themselves indispensable units of that community. They have literally made two blades of grass grow where none grew before.

As a profession we were not in position to judge the effects that were to be produced upon us by the appearance of mechanical motive power. Such a situation had never confronted the veterinarian before. From time immemorial human beings had depended upon equine motive power. Suddenly there was thrust into the field an entirely new force. It came, too, at a time when it seemed that a large number of people were mechanically inclined. Aggressive salesmanship and shrewd business tactics, together with a very admirable product and the American nation's natural inclination toward machinery, soon caused the virtual displacement of the driving horse. Most people realized that they were embarking upon an expensive deal when they replaced their driving horse with an automobile; however, they saw the benefits to be derived from the change not only to themselves but the members of their families as well. It gave them, in other words, a much wider horizon and they were willing to pay for this even though the expense was at times almost prohibitive.

The situation was entirely different when looked at from a purely business standpoint, and when mechanical motive power, in the same impelling manner, attempted to displace the draft horse, both in cities and on farms, they almost met a stone wall. This is true to an even greater extent in rural than in urban communities. The farmer, for example, soon found that he could not produce wheat at a dollar a bushel if a tractor was used for motive power. Furthermore, he found out that a 40-horsepower tractor could not be divided into 40 component units, and the farmer had many one-horsepower jobs on the farm. The tractor was not a flexible form of motive power. Feed for it could not be produced on the farm. In a few years it was worn out and

had left no progeny for its continuation. Tractor salesmen frequently use the statement, in order to effect sales, that a tractor consumes no feed during periods of idleness. To this the farmer soon learned to reply that the horse consumed no feed during the time it was working. From numerous contacts with farmers in the Middle West we are convinced that in the future the tractor may be used in a measure to assist the horse, but it will never supplant the horse. In other words we have arrived at the point where we may discount the influence of the tractor or mechanical motive power in its effect upon equine motive power and the ultimate effect upon the veterinary practitioner.

The general agricultural situation, from the financial standpoint is steadily improving. The farmer's dollar is again approaching the stage where it will soon be on a parity with the dollar of others. It is true that in certains sections of the country, as a result of over-production, either from excessive acreage or from unusual climatic conditions or from certain economic forces still in operation, the situation is still unsettled, but a broad, general review indicates a marked improvement in the finances of the agriculturist over those of a few years ago. The result is that the owner of live stock is again employing the veterinarian to an even greater extent than before the war.

The farmer's improved financial situation is not entirely responsible for larger employment of the veterinarian. He has been educated to appreciate the value of veterinary services. This has been brought about in such a slow manner that it has hardly been perceived. The extensive anti-tuberculosis campaigns, hog cholera campaigns, state and federal extension work, and the agricultural and lay press have all had a hand in giving the owner of live stock a much wider outlook. Our agricultural colleges have for a large number of years been educating young men to be better farmers. These young men have now arrived at the age where they are in positions of trust and influence, and in these latter capacities they are qualified to select and demand a very high class of veterinary service. It is not too much to say, therefore, that improvement in the financial and educational status of an agriculturist has rebounded to the credit of the qualified veterinarian.

Probably one of the most striking instances of improvement in the veterinary situation is the development of close cooperation between state and federal forces on the one hand, and the private practitioner on the other. In the early days of tuberculosis eradi-

cation and hog cholera control, this work was handled very largely by state and federal veterinarians. In many instances it seemed to infringe upon the practice of the private veterinarian. In the light of our present knowledge we cannot see how the situation could have been handled differently. Because of peculiar intensive training and wide range of contacts, and the almost daily battling of problems of animal health upon a large scale, certain men in the veterinary ranks employed by states and the federal government became imbued with high ideals of animal disease control work. In order to get this work started and to reduce slips to a minimum, it was necessary that the subordinate veterinarians engaged in this work should thoroughly understand the problem and be susceptible to absolute control in their professional actions. It would have required a good many years to imbue the private veterinarian with the system and the ideals so essential for the success of this problem. At the same time that the program was started, however, whether that was the eradication of tuberculosis or the control of hog cholera, or numerous other projects, an educational campaign was started and as rapidly as the private practitioner demonstrated that he was in sympathy with the ideals of these projects and that he fully grasped the significance of attention to detail and careful work, he was entrusted more and more with the carrying-out of these projects, so that at this writing a very large portion of the work is being done by the private veterinarian. In some sections of the country this step has not progressed as rapidly as in others, but as a whole the situation is approaching a very satisfactory stage.

Probably one of the most vexing problems the veterinary profession had to contend with was one forced upon them, the so-called county-agent problem. As in all other movements when first started, there is a good deal of uncertainty as to the exact status of the new movement. Those fostering it did not themselves fully understand its limitations, because new movements necessarily lack the background to serve for guidance. A farm-bureau agent was no different from other agencies. He did not fully understand what was required of him. The farmers of the community in which he worked did not understand his functions, with the result that they made upon him numerous demands for personal service. In their enthusiasm to make good and to satisfy their immediate clients, many of the county agents performed services against their own judgment and in-

clination. They infringed not only upon the duties of the veterinarian but also caused dissatisfaction amongst retailers in farm necessities. As time advanced, the various agencies understand each other and themselves better. Time has smoothed out many difficulties in this connection. While for a time it worked a hardship upon the local veterinarian, if he was the right kind of a veterinarian it has given him some enviable advertising so that he now stands higher in the estimation of his community than ever before. Farm bureaus to an ever-increasing degree recognize that the competent graduate veterinarian is an essential part of a live stock community and that they cannot expect to have this expert service unless it is made remuneratively possible. They have learned that they cannot get efficient service by doing the easy jobs themselves or permitting the county agent to do it for them, and expect the veterinarian to be at hand for the really difficult jobs. Farm bureaus are recognizing that is was not a constructive step—and the farm bureau is a constructive agency—to attempt to supplant a well-organized veterinary force by a new and untried and not-thoroughly-trained force, in the person of the farm-bureau agent.

With the smoothing-out, either actually accomplished or now in process of accomplishment, the veterinarian in the field again feels that he can recommend a veterinary course to those of his young friends showing an inclination for work of this kind. Our old friend, the economic law of supply and demand, is also going to be operative in this respect and, as the number of qualified veterinarians needed for the maintenance of the live stock health of the country falls below the requirements, there will be a normal reaction, with the result that our educational institutions will again be filled up, to a normal status, with candidates for the veterinary degree.

The present era in veterinary medicine has seen a wider extension in veterinary activities than any of its predecessors. It is well within the memory of many of us that the veterinarian was purely a horse practitioner. What is the situation today? The most representative one is probably in rural regions. Veterinarians in such communities will tell you that horse practice has not fallen off very much over what it was during the so-called "boom" days. Naturally, if it had not been for mechanical contrivances, horse practice would have increased instead of remaining stationary. The significance, however, is that with many of these practitioners, though horse practice is still on the same

plane as fifteen years ago, other sources of practice have been developed so that horse practice probably is not 50 per cent of the total amount of work that they are doing. More and more is the veterinarian called upon to treat other classes of live stock. In rural communities this is especially true of cattle, swine, sheep and poultry, while in urban locations pet animal practice has been developed to a very great extent. The situation at this time is more nearly what it should be than in the days of the horse practitioner. Our present-day activities and the value of our services are being recognized more and more and incidentally it is leaving behind the term "horse doctor," so much detested by the graduate veterinarian. We have arrived at the doorstep of opportunity such as we never dreamed of in the days of horse practice.

The Future

It is the field towards which we should all direct our gaze. The past is gone and forgotten, the present is upon us and we cannot materially alter it, but the future holds out for us immense possibilities if we will but grasp them. If we show the slightest hesitation, or if we are not thoroughly qualified, we will be pushed aside. And what are some of these opportunities? The answer is really the beginning of our discussion, "The Farmer and the Veterinarian."

We must have more knowledge, and scientifically sound knowledge is an exceedingly slow, laborious acquisition. Past experience has demonstrated the value of carefully planned and developed research work. This should be the basis of our professional activities. It may be acquired by at least two methods· in laboratories and in the field, by the specially trained research worker, and by the qualified practitioner in daily contact with the problems in the field, and an additional means of professional contact between the two.

Laboratory veterinary research is an immensely expensive undertaking and it does not always bring about positive results. It is unfortunate that negative results are not equally impressive. Recognizing the need for funds, and the frequently close personal intimacy existing between veterinary practitioners and individual members of the law-giving bodies, can a greater service be rendered to the live stock industry than personal solicitation for adequate support for research?

Adequate financial support also involves the question of con-

tacts between veterinary practitioners and state veterinary research workers, a situation that merits the greatest development. How can the laboratorian render his greatest service if he does not have qualified agents to keep him in contact with field conditions? And, outside of the rare gatherings in which we are now engaged, how can the practitioner benefit to the fullest extent by the research of the laboratorian? Virtually all veterinary sections of agricultural experiment stations should have more funds for the purpose of ultimately solving animal disease problems, and this can most logically be done by the laboratorian on the one hand, the veterinary practitioner on the other, and qualified veterinary agents to act as go-betweens In an attempt to solve the cattle abortion problem, many states are following exactly the outline suggested above. The intensive dairy states of the East should be leaders in this movement. It will work to the credit of the live stock interests, the veterinary practitioner, and the public institutions initiating it.

Veterinarians should take a greater personal interest in live stock problems. As individuals we must get the confidence of our clients. We will not get this by an acquaintanceship based on dollars and cents alone. We can get it by supplying the live stock owner with constructive, whole-hearted advice, by informing ourselves regarding their problems, and by joining their organizations.

How many veterinarians, for example, are aware of the fact that the average yearly milk production per cow, in Holland, is 7000 pounds; in Switzerland, 6000 pounds; in Denmark, 5000 pounds, while in the United States it is only 3000 pounds? This of course does not take into consideration that there are certain herds in America in which the yearly individual production runs as high as 14,000 or 15,000 pounds. This does not alter the fact that the average yearly production in the United States is exceedingly low. It costs no more in the way of feed to derive 7000 pounds from a cow than it does to derive 3000 pounds. Another illustration very much along the same lines is that the average weight of the fleece from sheep is anywhere from three to twelve pounds. It is interesting that there is a maximum record of a 50-pound fleece from one sheep. It is not to be supposed that a breed of sheep can be developed in the near future that will produce 50 pounds of fleece to the animal, this being given simply for the purpose of illustration. Equally impressive figures could be mentioned for poultry, for the beef-pro-

ducing animal, and other forms of animal industry. The idea that the veterinarian should get from this is that in every manner possible he should stimulate the owner of live stock to obtain animals of higher-producing ability. It will be a remunerative process for the live stock owner and the veterinarian will find that the owner of valuable or high-producing animals is much more likely to consult a veterinarian than the owner of mediocre animals.

In my opinion no veterinarian can obtain knowledge of agricultural conditions better and more quickly than by a frequent and careful perusal of some of the leading agricultural journals. Every veterinarian should be a subscriber to one or more of these journals. The locality in which he is located should determine to a considerable extent the nature of the journal to which he subscribes. If he is in an intensive dairy district, he should take a dairy journal. If poultry work takes up a very large part of his practice, he should subscribe to a poultry journal. The constant reading of these journals will give the reader a sympathetic attitude towards agricultural problems that he can obtain in no other manner.

I believe that every veterinarian should be an active member of the local farm bureau. This is a constructive organization, and a veterinarian belonging to it will not only have numerous valuable contacts, but he will form sympathetic friendships that can be acquired in no other manner. It seems to me that veterinarians have been peculiarly backward in this matter. If a similar opportunity were presented to any other wide-awake, aggressive concern, it would not have permitted it to go to waste for a single minute. Careful observation will disclose that aggressive business concerns, both large and small, are constantly looking for exactly such contacts. In many communities where there is still some so-called county-agent trouble from the veterinary standpoint, this would be done away with, with almost miraculous quickness, simply by the veterinarian joining and taking an active part in the work of the county farm bureau. It is a step that no veterinarian can afford to overlook.

Even the county agent himself, as an individual, can be made a most valuable asset to any veterinarian if we will but cultivate his friendship. This must not, of course, be a one-sided affair. If we expect the cooperation of the county agent, we must in turn cooperate with him. In some instances the veterinarian's condemnation of county agents has been peculiarly of a destruc-

tive nature, probably because this has been easy and dramatic. It is always easier to break a pane of glass than to set one. We must therefore be tolerant in our relationships and they can be worked out to the mutual benefit of all concerned.

The veterinarian can take an additional, personal interest in some of the small things that a farmer is likely to overlook. It seems to me that it is a good deal of a reflection upon a long-established practitioner of a community if there is an outbreak of an extensive sporadic disease amongst animals in that community. I mean that, for example, it should be considered a reflection upon the veterinarian if the hogs in his territory are uniformly and badly infested with worms. It is a duty of the veterinarian to instruct the owners regarding those sanitary measures which may be adopted to prevent this trouble. Another example: Most live stock owners resort to the emasculation of their own swine, frequently with bad results, especially the development of scirrhous cords. The veterinarian does not expect to do this work, he does not particularly care to do it, he knows that the owner is going to do it, then why not, during the season of the year when this operation is commonly performed, instruct his clients regarding the correct technic? Numerous other instances could be cited illustrating how, by a little personal interest, the veterinarian will benefit the live stock owners of his community, and incidentally entrench himself more firmly in the confidence of his constituents.

In those sections of the country in which animal husbandry turns more towards the raising of beef cattle and swine, and if at the same time it is a section of the country where certain infectious and contagious diseases are likely to break out, such as blackleg and hog cholera, it is the veterinarian's duty to keep live stock owners informed about the methods of protection against such diseases by appropriate vaccination. We can take a positive stand in our attitude towards those vaccines that are of known and determined value. We should be exceedingly careful about the recommendation of biological or other products whose value is at all questionable or that have not been established by careful, disinterested research work. The recommendation of one questionable agent is likely to react more seriously to the veterinarian's reputation than almost any number of sound, constructive advisements.

Farmers are becoming fairly well educated regarding the possibilities of tuberculosis eradication. This statement applies

especially to the progressive farmer. On the other hand, it is really surprising how little knowledge regarding tuberculosis and its method of eradication is in the possession of those who should be well-informed live stock owners. Probably veterinarians are not in position to judge, because of their own advanced knowledge. It is never going to do any harm, and it may be productive of immense good, whenever the opportunity presents itself, to feel out, tactfully and unobstrusively, the live stock owner's sentiments and knowledge regarding this important method of animal conservation.

Probably no phase of live stock development has been as rapid during recent years as that of poultry husbandry. As one writer has so aptly stated: "Poultry is the most widely distributed of any kind of live stock except work horses. The last census shows that 91% of the farmers in the United States kept poultry. The demand for medical science and practice as applied to poultry will continue with the increase in human population. The poultry industry is large enough to command the attention of the veterinary profession. How great the present need is, perhaps can be judged by the extent to which numerous proprietary medicines are filling advertising space with their claims, and the pockets of the advertisers with the poultrymen's money."

The vast poultry industry is menaced increasingly by fowl pox, canker, roup, fatal bronchitis, fowl cholera, fowl typhoid, coccidiosis, bacillary white diarrhea, blackhead, tuberculosis, parasitism, etc. In such an extensive poultry state as this, no veterinarian can afford to be ignorant about the methods of sanitation, prevention against disease, and the handling and production of poultry. Several veterinarians in the Middle West have informed me that a very large part of their practices, during those months of the year when veterinary practice is usually light, is taken up by doing poultry work. If veterinarians do not prepare themselves to take charge of this situation, others will, and the veterinary profession may lose one of its most important sources of revenue.

The main purpose for the presentation of this paper has been to point out how the veterinarian may improve his own professional condition and, at the same time, in a larger manner assist his live stock friends. In order to do this, the veterinarian must be imbued with the conviction that he is engaged in one of life's most important activities. If he does not have this optimistic viewpoint about his profession, he cannot hope to

impress others. There must be the closest kind of cooperation, not only within the ranks of the veterinary profession, but between veterinarians and closely allied interests, especially the agricultural classes. We should remember that anything good for agriculture is good for the veterinary profession.

I view the future of veterinary medicine with considerable enthusiasm and optimism. This feeling I am satisfied is shared in by a very large percentage of practitioners, judging from their actions and words as noted during an attendance at veterinary meetings in widely scattered sections of the country. The unrest of a short time ago, during which everyone was pessimistic, has been displaced by a forward-looking optimism that bodes well for the future of veterinary medicine in America. Possibly the pessimism of the past has not been without its beneficial effects. It caused those who were not wholesomely enthusiastic for the profession and its possibilities to forsake our ranks for other forms of endeavor and remuneration. It is exceedingly questionable whether these professional deserters were ever a source of strength for the profession. It is certain that the stress of the times caused them to weaken professionally and finally enter other fields of endeavor. On the other hand, there are the real builders of the future, our present personnel, who looked upon every obstacle as a hurdle to greater opportunities for service and for righteous gain, and who, purified and strengthened in the refining process, have emerged as the leaders in some of America's greatest conservation projects, the guardians of the animal health of the commonwealth.

It is well to remember that we have not yet reached the professional millennium. There are still questions to be met and solved, but we are ascending the grade and more and more are we departing from the "horse doctor" stage. We are attracting the favorable attention of the agricultural and lay press. The public is observing us with more and more favor as our contributions to human welfare are recognized, and if we will but grasp our opportunities, with a broad conception of our responsibilities, the time will yet come that universal acclaim will honor the profession of veterinary medicine and its personnel. The world is moving rapidly, from an educational standpoint. As laymen we should keep abreast of the times. As veterinarians we must be leaders, ahead of the crowd. If we slacken we lose our position, and others, probably not veterinarians, will supplant us. The watchword of the hour is "Forward."

PATHOLOGICAL CONDITIONS FOUND ON NECROPSY OF 280 DOGS

By MEYER WIGDOR*

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In conjunction with anthelmintic investigations conducted by Dr. M. C. Hall and the writer, on approximately 375 dogs obtained from the Detroit city pound, the dogs were examined postmortem, after being killed either by chloroform, chloretone intraperitoneally, or by shooting through the head, to determine not only the anthelmintic efficacy of the drug to be tested but also the effect of the anthelmintic on the animal.

In enumerating the gross pathological conditions found postmortem, only those dogs were chosen which appeared clinically normal, so that the series to be reported embraces the consideration of 280 dogs. Lesions that could be correlated with the anthelmintic treatment and those due to the agent used in killing the experiment animal were excluded, so far as possible, so that we have here represented the gross pathological conditions that might be expected in the average run of dogs in Detroit. It is regrettable that facilities were not available for microscopical studies of our material.

LUNGS

Anthracosis: Seventy-four, or 26 per cent, of our dogs showed deposits of anthracotic pigment in their lungs.

Infarct: Seven, or 3 per cent, of our dogs showed old infarcts of the lungs.

Bronchiectasis: One dog showed bronchiectatic cavities.

Adhesive pleurisy: One dog showed an old adhesive pleurisy.

Tuberculosis (?): Both lobes of one dog were filled with discrete, rather large nodules, which were not hard, but which appeared tuberculous in nature.

Another dog showed tubercle-like areas throughout.

Congenital anomalies: One dog had a left lung with only two lobes.

Several of the dogs showed pathological evidence of the various stages of a frank pneumonia and others the purulent bronchiolitis frequently associated with distemper, but since these animals

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were not clinically normal, they have been excluded from consideration in our present study.

Heart

Nodules on mitral valve: Twenty-one, or 8 per cent, of the dogs showed nodules on the mitral valve.

Thickened valves: An additional 9, or 3 per cent, of the dogs showed a thickening of the cusps of the valves.

Pericarditis and epicarditis: Two of the dogs had an old pericarditis and 3 had an epicarditis.

Hypertrophied heart: Four, or 1 per cent, of the dogs presented a hypertrophy of the heart.

Valvular incompetency: One dog had a widening and evident incompetency of the mitral orifice.

Kidney

This was by far the organ most commonly involved, a large majority of our dogs presenting some renal lesion on postmortem.

Cystic kidneys: A chronic nephritis was nearly always associated with the cystic condition. Seventeen, or 6 per cent, of our dogs presented cystic kidneys.

Medullary and cortical nephritis: One hundred five, or 38 per cent, of our dogs had a combined medullary and cortical renal involvement.

Medullary nephritis: In 27, or 10 per cent, apparently the medullary portion of the kidney only was involved.

Cortical nephritis: In 36, or 13 per cent, the cortical portion of the kidney was involved.

One hundred eighty-five, or 67 per cent, of our dogs therefore showed evidence of nephritis.

One dog had a congenital absence of one kidney with compensatory enlargement of the other kidney.

Another dog presented a kidney that apparently had a traumatic injury, for it was severed in two at one time and was healed with omental adhesions.

Another dog had a left kidney enlarged three or four times its normal size that was represented by a thickened capsule and was full of a red, grumous material with a bony pelvic structure, which was apparently a hydronephrosis complicated by hemorrhage. The other kidney was normal.

Another dog had a right kidney pelvis with an apparent congenital pseudo-lobulation opposite the pelvis.

Another dog showed a general fibrosis of the left kidney, following an old trauma, which had cut the kidney almost in two and had displaced it so that it was entirely posterior to the right kidney.

Liver

This organ was second to the kidneys in its frequency of involvement.

Cirrhosis: One hundred twenty-five, or 45 per cent, of the dogs exhibited a definite hardening and toughening in the liver consistency.

Degeneration: Eight, or 4 per cent, of the dogs exhibited a lighter-colored liver than normal, which was evidently associated with a fatty degeneration.

Gall-Bladder

Four dogs showed evidence of an acute cholecystitis.

Three dogs showed a chronic cholecystitis.

One dog showed an acute hemorrhagic cholecystitis with blood present in the bile.

One dog had a black pigmented papilloma, about the size of a shot, in the fundus.

Spleen

Splenitis: This was evidenced either by a toughening of the spleen or a definite congestion of the organ.

Thirty-two, or 11 per cent, of the dogs showed the above pathological condition.

Traumatic injury: Seven, or 2.5 per cent, of the dogs showed evidence of previous traumatic injury to the spleen (evidently having been run over at some time), which was healed with omental adhesions.

Miscellaneous: One dog had a number of hemorrhagic nodular formations, about 1 cm. in diameter, which were cystic and contained a sero-sanguineous fluid.

One dog had a hematoma, 1 cm. in diameter, on the under surface of the spleen, near one end of the mesenteric attachment at the large end of the organ.

One dog had tumor-like areas, about 2 cm. in diameter, throughout the spleen.

One dog had a few, small, white nodules present, which suggested a local endothelial proliferation.

One dog had a fenestration, a ½-inch aperture, near the

smaller end of the spleen and small nodules on the organ near the fenestration.

Five dogs showed anomalies in the morphology of the organ. In three of the dogs, a small dorsal flap was present. In one dog there was a U-shaped, crateriform excavation at the large end. In another dog there was a distinct notching at one end. In another dog there was a distinctly-malformed spleen, with large nodules in it.

Urinary Bladder

The bladder often either showed petechial hemorrhages or was congested or inflamed. Sixty-six, or 24 per cent. of the dogs showed evidence of cystitis.

Gastro-Intestinal Tract

One dog showed a cecal intussusception; the tip of the cecum was inflamed and was invaginated for about 1½ inches.

One dog had one large (2 cm. at the base) and two small, hard, apparently-carcinomatous growths at the pylorus of the stomach.

Four dogs had ulcers of the stomach. One dog had been under daily treatment of one dram of a proprietary for worms in swine, over a long period of time, while another dog was under stannous chlorid treatment (2 grams) and had two ulcers present. In these two dogs it was thought that the anthelmintic treatment was probably responsible for the ulcers.

Of the two dogs in which anthelmintic treatment was not held responsible for the ulcers, one had a single pyloric ulcer, while the other had six to seven ulcers in the pylorus in an advanced stage of necrosis, which were oozing blood.

One dog had an old, healed, duodenal ulcer.

One dog had tumor-like growths of inflammatory origin, scattered through the large intestine.

Pancreas

One dog showed a pancreatitis.

Thyroid

Since Detroit is in a goitre district, the incidence of goitre in Detroit dogs is of added interest.

Six, or 2 per cent, of the dogs showed definite prominent enlargement of the thyroid. In one dog the right lobe was greatly enlarged and was cystic and hemorrhagic and contained a hard fibro-cartilaginous nodule in one area. The other lobe

was about normal in size but showed areas of degeneration. Another dog showed marked enlargement of both lobes, with the trachea compressed laterally between them.

Miscellaneous Lesions

One dog had an elongated uvula.

One dog had a bluish papilloma of the lower lip.

One dog was a cryptorchid. The right testis was small and lay outside the inguinal canal, subcutaneously, on the abdominal panniculus.

One dog had an epiplo-omphalocele.

One dog had a cataract of the eye.

Conclusions

Postmortem examinations on apparently normal dogs disclose a multiplicity of pathological conditions.

The kidney is the organ most commonly involved, followed in order by the liver, urinary bladder and spleen.

PROFESSOR BENESCH AT PENNSYLVANIA

Dr. Franz Benesch, Professor of Obstetrics in the Vienna Veterinary College, Vienna, Austria, who is spending a few months in this country under the auspices of the International Education Board, gave a very interesting and instructive lecture and demonstration on the subject of "Obstetrics and Sterility," at the University of Pennsylvania School of Veterinary Medicine, May 10, 1926. Dr. John W. Adams acted as interpreter.

After an interesting lecture, Dr. Benesch demonstrated how the external genitalia, vagina, cervix, tail, etc., can be anesthetized by a local hypodermic injection between the last sacral and first caudal vertebrae. The results produced were very conclusive, producing a complete anesthesia of these parts.

Dr. Benesch then demonstrated an instrument used in embryotomy which was very efficient. It consisted of a braided, flexible wire, which was passed through a metal tube used to hold it in place and prevent injury. This wire, when pulled back and forth, acted as in effective cutting agent.

One hundred fifteen veterinarians and students were present. Dr. Benesch has a pleasing personality and is an earnest and hard worker. He made a very favorable impression on all those present.

PRELIMINARY REPORT OF EXPERIMENTAL WORK IN THE CONTROL OF BOVINE INFECTIOUS ABORTION*

By C. P. Fitch, W. L. Boyd, *and* R. E. Lubbehusen

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The control of any infectious disease is fundamentally based on two general principals. These are (1) immunizing the individual against the virus or (2) keeping the virus away from the individual. During the past six years we have been conducting experiments on the value of immunizing agents for the control of bovine infectious abortion. The results of this work do not indicate that bacterins, vaccines or serums will reduce the losses resulting from this disease to a desirable minimum. Other methods are necessary, if this disease is to be satisfactorily controlled.

The data resulting from experimental work on the possibility of a clean herd, on the basis of the blood tests, are very meager. Robertson, in South Africa, M'Fadyean, in England, Simms and Barnes, in this country, have published the results of their work. These data are quite encouraging. In order to learn more concerning this method of control and further to determine if it is feasible to keep an infected and a clean herd on the same farm under ordinary conditions, this experimental work was undertaken.

Late in December, 1923, we established two experiment herds in the Veterinary Division at University Farm. These are kept in two barns, separated by not more than 75 feet, and are tended by the same men. One herd is infected with *Bact. abortus* and the other herd is free of the disease, as determined by the serum tests. Both agglutination and complement-fixation tests are employed and the animals are tested every month. Each herd has its separate paddock and there is absolutely no physical contact between the two groups of animals. No efforts are made by the men taking care of these two groups to prevent the spread of infection, that should not be carried out on any farm. In brief, we have attempted to keep these herds entirely separate, but maintained under ordinary farm conditions. The drainage is from the infected toward the clean herd. The accompanying

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tables give some detailed information concerning these two groups:

Clean Herd

Some of these animals merit special attention. Animal 6 was used as a check in our work on bacterins and vaccines. She had given birth to two calves previous to the beginning of the experiment here reported. Two services only were required for these pregnancies. Following the second calving, which was normal, there was an absence of estrum due to a retained corpus luteum, which was removed. Four services were necessary for this pregnancy. This animal conceived on the first service following her last calf.

Animal 30 was born October 22, 1922. This is one of the very few animals in our experience which have given a positive reaction to both serum tests during the entire first year. This cow's dam was a positive reactor and we isolated *Bact. abortus* from the placenta at the birth of animal 30; *Bact. abortus* was present also in the milk of her dam. She was allowed to nurse for the first seven months. Blood tests, April 1, 1924, showed: agglutination, negative; complement fixation, positive. This reaction continued until January 1, 1925, when the animal became negative to both tests. During this interval the titre of the complement-fixation reaction gradually declined. This animal was placed first in the infected herd and was not transferred to the clean herd until July 11, 1925. The blood reactions have remained negative and bacteriological examinations of placenta and milk show no evidence of infection with *Bact. abortus* (Bang).

Animal 39 calved normally and was apparently perfectly well when last seen during the evening of December 26, 1924. She was found dead in her box-stall on the morning of December 27, 1924. A careful autopsy revealed a ruptured blood-vessel in the brain. This is the only case of cerebral apoplexy we have ever seen in the cow.

Animal 42 was purchased September 27, 1923, when about one year old. She was in poor condition at this time and always showed signs of pulmonary difficulty. Tuberculin tests were negative. After calving January 9, 1925, she became much emaciated and coughing was pronounced. The diagnosis was pulmonary emphysema and possibly tracheal stenosis. Autopsy showed extensive purulent bronchial pneumonia, involving principally the anterior lobes. These lobes pressed very tightly

against the trachea which was markedly compressed at its point of origin. The posterior lobes were not pneumonic but markedly emphysematous.

Animal 44 had recently calved at the time of purchase, December 21, 1923. The calf was one day old at this time. This animal came in heat fairly regularly but failed to conceive. Numerous physical examinations failed to show any reason why conception should not take place. The ovaries were manipulated and the uterus massaged. Twenty-two months after purchase, following repeated services without conception, she was slaughtered. The genital organs showed no evidence of disease microscopically or macroscopically. Cultures remained sterile. This is a very instructive case, for it very well illustrates the fact that sterility may occur without demonstrated cause.

Animal 48 is an old cow, purchased December 21, 1923. Her previous history is unknown. She aborted a six-months fetus, September 30, 1924. A mucor was isolated from the placenta and from the stomach contents of the fetus. This organism agreed culturally and morphologically with the one described by Smith. The animal retained a portion of her placenta and developed cystic changes in one of her ovaries, but nevertheless made a fairly rapid recovery. Her next calving was normal. This case illustrates the fact that abortions may occur in herds free of infection with *Bact. abortus* (Bang).

Infected Herd

Animal 13 was used in our experiment with vaccines. She was injected with living vaccines. Previous to the experiment here reported she had two calves, for which three services were necessary. Placentitis existed at the termination of each pregnancy. This was rapidly followed by metritis. Recovery was slow but complete. After her last calf, August 26, 1924, abscesses developed involving the uterus and ovaries, and she was killed and autopsied. Postmortem examination showed three large abscesses (8-12 cm.) involving especially the left ovary, tube, cornu, and the floor of the vagina. Pure cultures of *B. pyogenes* were isolated from each abscess. This animal was a positive reactor to both serum tests. *Bact. abortus* was never isolated from the milk or placenta of this animal.

Animal 22 was calved, June 10, 1922. She was in the clean herd until July 1, 1925. Her dam was a positive reactor. *Bact. abortus* was isolated from the milk of the dam during the time

animal 22 was allowed to nurse. The serum tests were negative, however, until July 1, 1925. She first calved, August 20, 1924, and the placenta was retained. A bacteriological examination of the uterine discharge, on August 29, 1925, showed *Staphylococcus albus*. Involution progressed rapidly and she conceived by the first service, October 27, 1924. Both serum tests, June 1, 1925, were negative. The tests on July 1, 1925, were positive. She was immediately removed from the clean herd and placed in quarantine. Another test, July 20, was also positive. She calved normally, July 24, 1924, and expelled her fetal membranes within four hours. *Bact. abortus* was isolated from the placenta and from the colostrum. Involution of the uterus was retarded as a result of endometritis. She was placed in the infected herd on August 10, 1925. Her genital organs are now normal clinically and she has been bred twice.

Animal 47 was purchased, December 21, 1923. She was approximately 3 years old at that time and probably had never calved.

Animal 50 was purchased, December, 21 1923. Approximately two years old.

Animal 51. This animal was purchased, January 11, 1924, and was approximately 11 months old. She has never been a strong reactor to the agglutination test, but has reacted strongly to the complement-fixation test. Examinations of placenta and milk have all been negative for *Bact. abortus*. This is an animal in which it is very doubtful if *Bact. abortus* is active. She has never had a retained placenta nor has she ever aborted. The only evidence on which we are keeping her in the infected herd is the positive result of the complement-fixation test.

Animal 54 was a gift and came into the herd, September 5, 1924. Previous to this time she had aborted three times and produced one living calf. *Bact. abortus* (Bang) was isolated from the placenta, fetus and colostrum, following the abortion of July 30, 1925. This cow did not recover rapidly and was still discharging muco-pus, September 14, 1925. She was bred twice and failed to conceive. A hygroma involving the left carpal joint became troublesome and she was sold for slaughter, December 28, 1925.

Animal 62 came into the herd, January 16, 1925. She was born December 21, 1920. She had aborted twice and had produced one healthy calf. She conceived on the first service, February 19, 1925, and aborted August 11, 1925. The uterus

quickly involuted and she was rebred, first on September 21, 1925, and again on October 12, 1925. She is now in calf from the October breeding. This animal is an excellent example of those cows which abort several times and breed fairly regularly. *Bact. abortus* has been isolated from the milk and aborted feti of this animal.

Animal 63, a heifer, is the calf of cow 47. This was her first calf since being in our herd. She aborted her next calf. Animal 63 nursed her dam and during this period *Bact. abortus* was isolated from the milk. At the present time this heifer has a negative blood-test. This animal illustrates the fact that calves from infected dams are not themselves infected and may be reared free of the disease.

Animal 65. This cow was purchased from the stock-yards the day after she aborted, April 29, 1925. *Bact. abortus* was isolated from the fetus. She developed an extensive infection of the uterus and was condemned as sterile and slaughtered, May 21, 1925. Autopsy showed a chronic productive inflammation involving the right ovary and tube, causing extensive adhesions to the visceral peritoneum. In these adhesions was an abscess 10 cm. in diameter. The uterus showed an extensive endometritis with necrosis of portions of the mucosa. Malodorous pus was present throughout the organ. Bacteriological examination including animal inoculation failed to show *Bact. abortus*, but *B. pyogenes* was isolated from the pus. This animal illustrates how quickly the Bang organism disappears from the uterus following abortion, and how well the field is prepared by it for pyogenic bacteria.

Discussion

The data presented seem to indicate that the Bang infection does not spread rapidly among two groups of animals which are kept entirely separated. Animal 22 is the only individual becoming infected in the clean herd. The results are quite encouraging in that it may be feasible for a breeder to keep an infected and a clean herd on the same farm, but separate and distinct from each other. The advantages of the clean herd are evident from the data here set forth. In this herd 20 pregnancies have resulted in 18 healthy calves. There has been one abortion and one dead calf. Nine animals are now pregnant. Only one case of retained placenta has occurred. Fifty-five services have been necessary for 29 pregnancies. This herd now consists of seventeen females

of breeding age and seven calves. In the infected herd two cows have been destroyed because they were incurably sterile, due to infection. Four abortions have occurred. Only seven healthy calves have been produced. Eight cases of retained placenta have been treated. Five females are now pregnant. Thirty-eight services have been necessary for sixteen pregnancies. This herd now consists of eight females of breeding age and one calf.

Several noteworthy things have occurred in this experiment which, although well known, nevertheless merit special attention. Animal 48 illustrates the case of an abortion not due to the Bang organism. Animal 22 calved a healthy calf at full term, but her placenta and milk were teeming with abortion bacteria. Animals

TABLE I—*Data on clean herd. January 1, 1924, to February 1, 1926*

ANIMAL	AGE (YRS.)	HEALTHY CALVES	DEAD CALVES	ABORTIONS	RETAINED PLACENTAS	SERVICES	PRESENT CONDITION AS TO PREGNANCY	DATE OF LAST CALVING	DATE OF LAST SERVICE	REMARKS
6	5	1	0	0	0	5	Pregnant	3-2-25	4-26-25	
21	3	2	0	0	0	4	Open	11-23-25		
26	3	2	0	0	0	3	Pregnant	9-10-25	10-17-25	
30	3	2	0	0	0	3	Open?	11-23-25	1-26-26	
34	3	2	0	0	0	4	Open	12-6-25		
35	3	2	0	0	0	6	Pregnant	5-15-25	6-23-25	
39	2	1	0	0	0	1		11-7-24		Note 1
40	2	1	0	0	0	2	Pregnant	5-7-25	9-18-25	
42	2	1	0	0	0	3		1-9-25		Note 2
43	3	1	1	0	0	5	Open	11-24-25	1-22-26	Note 3
44	8	0	0	0	0	12		12-19-23		Note 4
45	4	1	0	0	0	6	Pregnant	3-1-25	9-7-25	Note 5
48	10	1	0	1	1	5	Open?	11-22-25	1-13-26	Note 6
49	2	1	0	0	0	3	Pregnant	9-5-25	11-17-25	
55	1	0	0	0	0	1	Pregnant		10-1-25	
57	1	0	0	0	0	2	Pregnant		9-29-25	
59	1	0	0	0	0	1	Pregnant		11-19-25	
60	1	0	0	0	0	0				
64	11 mos	0	0	0	0	0				
66	8 mos	0	0	0	0	0				
878	3	Bull. Sold for slaughter 3-25-24.								
111	3	Bull. Now being used for service.								
		5 female calves.								

Note 1. Died, cerebral hemorrhage, 12-27-24.
Note 2. Killed, 5-19-25, because of pulmonary emphysema.
Note 3. Dystokia at full term, due to size of calf.
Note 4. Killed, 10-6-25, because sterile. Genital organs normal. Cultures negative.
Note 5. Purchased, 12-21-25; approximately two years old.
Note 6. Aborted six-months fetus, 9-30-25. Mucor isolated from fetus.

13 and 65 became permanently sterile from infection following abortion. This infection was not the Bang organism, but followed in each instance invasion by *Bact. abortus*. Animal 44 was apparently sterile and from an unknown cause. Infection so far as could be told was not the cause. These as well as other factors must be taken into consideration when attempting to maintain a herd free of *Bact. abortus*.

The results secured to date seem to indicate that it is feasible for a breeder to maintain a clean and an infected herd on the same premises tended by the same men. We do not believe that we are now justified in advising the slaughter of valuable animals infected with *Bact. abortus* (Bang). On the other hand something must be done with them. There are data to show that the only satisfactory method of controlling the infection is on the basis of the tested and clean herd. This immediately brings the reacting animal into prominent notice. Some way to dispose of these reactors advantageously must be devised. The cattle-breeding industry cannot stand the drain of the slaughter method uni-

TABLE II—*Data on infected herd. January 1, 1924, to February 1, 1926*

Animal	Age (Yrs.)	Healthy Calves	Dead Calves	Abortions	Retained Placentas	Services	Present Condition Condition as to Pregnancy	Date of Last Calving	Date of Last Service	Remarks
13	4	1	0	0	1	2		8-26-24		Note 1
22	3	1	0	0	1	4	Pregnant	8-24-25	11-30-25	
46	3	1	0	0	1	6	Pregnant	2-15-25	8-30-25	
47	5	1	0	1	1	6	Pregnant	1-7-25	11-10-25	Note 2
50	4	1	0	1	1	4	Open	1-7-26		Note 3
51	3	2	0	0	0	4	Open	1-2-26		
54	8	0	0	1	1	4	Open		10-1-25	Note 4
62	5	0	0	1	1	3	Pregnant		10-12-25	Note 5
63	1	0	0	0	0	1	Pregnant		11-9-25	
65	4	0	0	0	0	0				Note 6
67	4	0	0	0	1	2	Open?		12-21-25	Note 7
69	6 mos									Note 8
52	3	Bull. Sold for slaughter, 10-14-25. A positive reactor.								
58	1	Bull. Seven months calf of cow 50. Now negative to both serum tests.								
24	2	Bull. Sold for slaughter, 7-22-24. A positive reactor.								

Note 1. Slaughtered, 10-30-24. Large abscesses involving uterus and ovaries.
Note 2. Aborted a 5½-months fetus, 9-4-25.
Note 3. Aborted a 7-months fetus, 9-24-24.
Note 4. Aborted an 8-months fetus, 7-30-25. Sold for slaughter, 12-28-25.
Note 5. Aborted a 6-months fetus, 8-11-25.
Note 6. This animal aborted, 4-28-25; purchased, 4-29-25. Killed, 5-21-25. Abscesses of uterus.
Note 7. This animal aborted, 8-5-25; purchased same day.
Note 8. This is the last calf of cow 22.

versally applied to the control of the disease due to the Bang organism. Many reactors will produce healthy calves which will develop into valuable breeding animals. Some of the reactors recover from the effects of the organism and their blood becomes negative. So far as can be observed, these individuals do not harbor the organism. Exceptions occur, of course. We believe that the results obtained in this experiment offer a feasible method for the disposal of animals which react to the blood tests for *Bact. abortus* (Bang). This experiment is to be continued and this is merely a preliminary report.

COURSE IN MEDICAL BIOLOGY AT M. S. C.

Faculty members of Michigan State College have approved the offering, beginning with the opening of school, next September, of a new course to be called medical biology. It will be a four-year course leading to a science degree and will have as its object the training of students for work of a scientifically technical character in hospitals, clinics and laboratories..

The new course has been devised in answer to a demand for men and women with a knowledge of certain fundamental sciences but not trained in certain phases of medical work. The new course, which the faculty members at Michigan State College believe to be largely a new undertaking, will be headed by Dr. Ward Giltner, professor of bacteriology and hygiene. All of the work presented in the new course has been given at Michigan State College before, but the present grouping allows work to be taken to certain definite ends.

Engineering Buildings, University of Kentucky.

THE AGGLUTINATIVE AND ANTIGENIC PROPERTIES OF SALMONELLA PULLORA AND EBERTHELLA SANGUINARIA

By F. P. MATHEWS

Purdue University Agricultural Experiment Station

Veterinary Department

Lafayette, Indiana

Serological tests have been used quite generally for the diagnosis of infectious diseases of domestic animals for more than two decades. Measures that tend to control or eradicate some of the more economically important diseases are based on these tests. During the past few years the agglutination test for bacillary white diarrhea has been given special attention by investigators and practicing veterinarians. This increased interest has been undoubtedly contributed to by the past and prevalent heavy traffic in baby chicks, and a subsequent high death-rate following arrival, which has resulted in a demand from the field for protection from this disease.

Persons familiar with the agglutination test in general know that it has well-recognized limitations, and that some of the compensatory factors contributing to such limitations are understood, but there are other potential factors that also contribute to the utility of this diagnostic aid, which, if better appreciated, might necessitate modifications in the technic of its application, as well as some of the control measures based thereon. In this connection the control of any disease as widely spread as bacillary white diarrhea would be considerably embarrassed by the frequent occurrence of strains of *Salmonella pullora* possessing feeble or non-antigenic properties, a condition occasionally encountered in other members of the paratyphoid group. The occurrence, in nature, of organisms having different pathogenic but closely allied antigenic properties, is a factor reducing the specificity of the agglutination test as a whole, and the one for bacillary white diarrhea in particular. The antigenic relationships of *Eberthella sanguinaria* and *S. pullora* have been shown to be closely related, but their pathogenic properties have been considered to be quite distinct. However, more recent knowledge on the occurrence of

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E. sanguinaria in baby chicks, and the lesions produced therefrom, tends to show that the pathogenic properties of these two organisms are more closely associated than has been generally considered in the past.

Smith and Ten Broeck[1] were among the first investigators to demonstrate the antigenic relationships between *S. pullora*, *E. sanguinaria* and *E. typhi*. They were unable to differentiate *E. sanguinaria* and *S. pullora* by means of the agglutination test. In a similar work Rettger and Koser[2] arrived at like conclusions; Hadley, Elkins and Caldwell,[3] in a very extensive study of these and closely allied organisms, were unable to differentiate *E. sanguinaria* and *S. pullora* by means of the agglutination test and, in a like manner, Mulsow,[4] St. John-Brooks and Rhodes,[5] and Edington[6] arrived at similar conclusions. There is little evidence to show that non-antigenic strains of *S. pullora* have been encountered. In the articles just cited there was no evidence produced whereby such a conclusion could be drawn. In practically all studies of the antigenic properties of these two organisms, the strains employed have been grown on artificial media for a considerable length of time, a factor known to influence the agglutination as well as antigenic properties of bacteria.

For this reason the scope of this work was designed to include a study of the agglutinative variation of *S. pullora*, the antigenic properties of any variants encountered, and the possible bearing such organisms might have on the diagnosis of the disease in mature birds and, also, a study of the antigenic relationships of *E. sanguinaria* and *S. pullora*.

Experimental

All morphological and biological characteristics of the different strains of the microorganisms used were typical of the species to which they belonged and the first studies of their antigenic and agglutinative properties were conducted within thirty days from the time they were first isolated. Forty-eight strains of *S. pullora* were isolated from baby chicks and eleven strains from mature birds. One strain of *E. sanguinaria* was isolated from a baby chick and nine strains from hens that had died of fowl typhoid. In so far as could be determined, no two strains of the same organism could be traced to a single origin. The organisms were grown on pork-infusion-agar flats, containing 1% peptone, 1.5% agar, and .5% NaCl and having a pH of 7.4. The 48-hour growth was incubated at 37° C. and washed

off with physiological salt solution (phenolized .5%) and standardized to a turbidity of 3 according to McFarland's nephelometer.

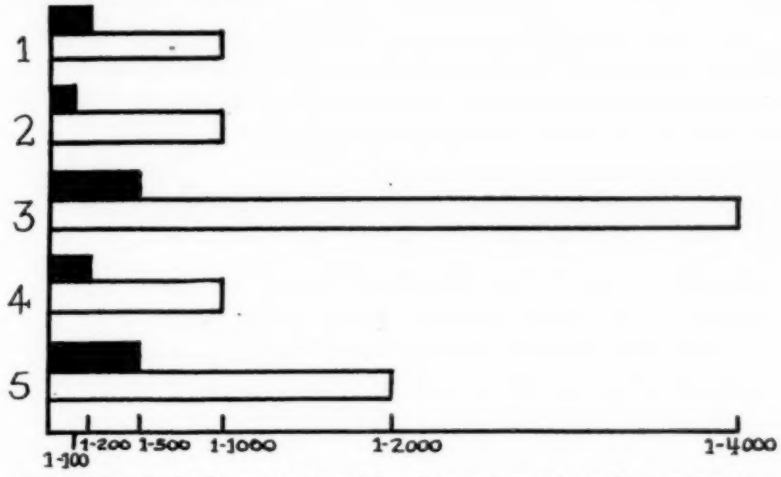
Since the primary object of the experiment was to study the agglutinative properties of all organisms within thirty days from the time they were first isolated, the agglutination tests were necessarily divided into two groups, as it was impossible to obtain a sufficient number of strains conforming to the stated requirements during one isolation period. The first group of tests deals with the agglutination of antigens prepared with cultures isolated from baby chicks, first, by the sera of naturally-infected hens, and second, hens immunized with single strains of either *S. pullora* or *E. sanguinaria*. In the second group of tests the organisms were isolated from both baby chicks and mature birds. The titre of an immune serum was determined for all antigens at the same time. The tests were read after 24- and 48-hour incubation periods, until it was evident that the 48-hour reading would not change the final results, when this reading was discontinued. All hens used for the production of single-strain, immune sera were first tested with all antigens to insure the absence of pre-existing agglutinins. The immune sera were then produced by the subcutaneous injections of agar-slant cultures suspended in salt solution and heated to 56° C. for 30 minutes, followed in two to four weeks by the injection of living cultures.

The agglutinin-absorption tests were conducted by washing a 24-hour growth of *S. pullora* or *E. sanguinaria* from an agar flat with a small quantity of physiological salt solution, diluting this suspension with an equal amount of the immune serum desired, and incubating the resultant mixture four hours at 37° C. The mixture was centrifuged, and the clear supernatant solution pipetted off. The resultant diluted serum was then tested the same as before absorption.

Results

If certain strains of *S. pullora* have different agglutinative properties that limit the efficiency of the diagnosis of bacillary white diarrhea in mature birds, it would be reasonable to expect that such properties would be demonstrable by testing antigens, each prepared from a single strain of *S. pullora*, with the sera of naturally-infected hens. Thirty such *S. pullora* antigens and one *E. sanguinaria* antigen were tested with the sera of 20

naturally-infected hens from 19 flocks. A figure illustrating the results is given (graph 1).



Titers of five sera for *E. sanguinaria* and *S. pullora* antigens; the solid represents *E. sanguinaria* and the open *S. pullora* antigens. Graph 1, serum from a naturally-infected, mature bird, tested with one *E. sanguinaria* and 30 *S. pullora* antigens; graph 2, *E. sanguinaria* immune serum; graph 3, *S. pullora* immune serum, both tested with one *E. sanguinaria* and 30 *S. pullora* antigens; graph 4, *E. sanguinaria* immune serum; graph 5, *S. pullora* immune serum, both tested with 10 *E. Sanguinaria* and 57 *S. pullora* antigens.

Graph 1 shows that *E. sanguinaria* antigen ceased to agglutinate above a 1-200 dilution, whereas the *S. pullora* antigens ceased to agglutinate above a 1-1000 dilution. Graph 1 represents the results as a whole. With one exception, each serum had one individual titer for all *S. pullora* antigens, which was always much greater than the corresponding titer for the *E. sanguinaria* antigen. The titer of this serum for both groups of antigen was 1-25. The titer of some of the sera was 10 to 20 times greater for *S. pullora* antigens than it was for the *E. sanguinaria* antigen. The relative sensitiveness of the two groups of antigen was further demonstrated by testing the sera of two hens, one that was immunized with a single strain of *S. pullora* and one with a single strain of *E. sanguinaria*. (See graphs 2 and 3.)

Each serum had one titer for all *S. pullora* antigens as shown in graphs 2 and 3, which was eight and ten times as great as it was for the *E. sanguinaria* antigen. Graph 2 illustrates another interesting condition which remained constant with the sera of all hens immunized with *E. sanguinaria*, namely, the ability of such a serum to agglutinate all *S. pullora* antigens to a much greater dilution than its homologous antigen.

The second group of tests deals with 28 antigens prepared

from the strains previously used and 29 antigens prepared with freshly-isolated strains of *S. pullora*, eleven of which were obtained from old hens and the balance from baby chicks. Ten *E. sanguinaria* antigens were also tested at this time, one strain having been used in the preceding tests, but the balance were freshly-isolated strains. This group of antigens was tested with the sera of six hens, each immunized with a different strain of *S. pullora* and with the sera of three hens immunized with single strains of *E. sanguinaria*. Two graphs (4 and 5), illustrative of the results obtained, are given.

Graphs 4 and 5 show that each serum had one titer for all antigens of the same genera, which, in the case of *S. pullora*, was from four to eight times as high as the corresponding titer for *E. sanguinaria*. This was true in all tests with one exception. The serum of one hen had a titer of 1-500 with *S. pullora* and 1-200 with *E. sanguinaria*, which was the maximum titer obtained in any of the tests, although many large doses of living *E. sanguinaria* were given intraperitoneally, in an effort to increase the agglutinating power of the serum from this hen. One *S. pullora* antigen was self-agglutinating, a faculty still possessed by the organism producing this antigen. This organism was used to produce the serum, the results from which are illustrated in graph 5.

The results obtained with the agglutination-absorption tests supported the results of Muslow[4], Edington[6] and others, in that the agglutinins in an *E. sanguinaria* immune serum for its homologous antigen and for *S. pullora* antigens can be entirely removed by absorption with either of these organisms; the same holding true for *S. pullora* immune serum.

Discussion

In several duplications of the experiments detailed in this paper, the work has dealt with approximately 200 antigens, necessitating over 3000 agglutination tests. No strains of *S. pullora* possessing agglutinative or antigenic properties deviating from the genera have been encountered with the one exception noted, a self-agglutinating organism, possessing no other differentiating features. From these results it would appear that in the practical application of the agglutination test, non-antigenic strains of the organism play an immaterial part in the control of the disease. It is also evident that *E. sanguinaria* antigen can be used for diagnosing the disease in mature birds, providing

reactions in lower dilution be considered as a diagnostic criterion. (Also demonstrated in previous unpublished work of this department.) In fact such an antigen possesses distinct advantages since it can be produced on a more economical basis. The difficulty encountered in normal agglutinins is practically eliminated and, by using a low dilution, the test can be more readily and accurately conducted by persons who do not appreciate the necessity of a high degree of accuracy in laboratory technic.

The results presented on the differentiation of *S. pullora* and *E. sanguinaria*, by means of the agglutination test, indicate that the two organisms can be differentiated by means of this test, at least when dealing with recently-isolated strains of the two organisms. Such a method is certainly as satisfactory as some of our other bacteriological aids in the differentiation of closely-associated species of bacteria. There was no pronounced variation in the agglutinability of these two species of bacteria demonstrated by the investigation previously mentioned. There are at least three possible explanations for these contradictory results. The first is the length of time the organisms studied had been propagated on artificial media; second, the methods employed in the preparations of the antigen and, third, the source of *S. pullora* strains upon which antigenic studies have been conducted. The experiments discussed include only strains of the organism responsible for the death of baby chicks and do not include an organism apparently responsible for the death of mature birds in which the lesions are indistinguishable from fowl typhoid, but which gives typical sugar reactions for *S. pullora*. Strains of such an organism are being included in similar studies and may furnish material for a second publication.

Summary

The results of these experiments tend to show, from a practical standpoint, that the losses in baby chicks due to *S. pullora* are caused by strains of the organisms having similar antigenic properties. Evidence is cited whereby the differentiation of freshly-isolated strains of *S. pullora* and *E. sanguinaria* can be accomplished by means of the agglutination test.

References

[1]Smith, T., & Ten Broeck, C.: Jour. Med. Res., xxxi (1915), p. 547.
[2]Rettger, L. F., & Koser, S. G.: Jour. Med. Res., xxxv (1917), p. 443.
[3]Hadley, P., Elkins, M. W., & Caldwell, D. W.: The colon-typhoid intermediates as causative agents of disease in birds: 1. The paratyphoid bacteria. Agr. Exp. Sta. R. I. State Coll. Bul. 174.
[4]Muslow, F. W.: Jour. Inf. Dis., xxv (1919), p. 135.
[5]St. John-Brooks, R., & Rhodes, M.: Jour. Path. & Bact., xxvi (1923), p. 433.
[6]Edington, J. W.: Jour. Path. & Bact., xxvii (1924), p. 427.

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

BACILLUS PARATYPHOSUS B INFECTION OF CANARY BIRDS

By MALCOLM J. HARKINS,

Research Institute of Cutaneous Medicine, Philadelphia, Pa.

This infection in canaries, as observed by veterinarians in general practice, is comparatively rare, generally because they are not consulted, yet the disease is known to be quite widespread, existing principally in breeding aviaries and in bird-shops, incurring considerable financial loss to those engaged in this industry.

Paratyphoid B infection was first described by Joest[1] in 1906, and later confirmed by several others, chief of whom were Gilruth, Pfeiler, Adam and Medler.

The incidence reported here occurred among two hundred canaries, a part of several thousand imported to this country a few weeks before the first death occurred. Of the two hundred birds, 196 (74.5 per cent) died within three weeks of their arrival at the pet-shop. The first bird died within two days of arrival but, after this, deaths were quite frequent, amounting to as high as twelve a day. Whether the infection existed among the entire importation or how many died it was not possible to learn. The infection was known to exist in the building where the birds were housed, but no deaths had occurred for several months previously.

Excellent sanitary measures were practised at all times in the building, but as early sale was anticipated the birds were held in the original small wooden cages in which they were imported. These cages, as one would suppose, were quite soiled.

Symptoms: At first it was observed that the birds were less active than usual, and would sit on the perches with ruffled feathers. Later the head would be turned backward, between the wings. The appetite was usually suppressed, respirations quickened and the droppings thin. Usually the birds died in

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convulsions. The interval between onset of symptoms and death was approximately thirty-six hours. In a few birds death occurred very suddenly, approximately two hours elapsing between the onset of symptoms and death.

Autopsy: Generally an enlargement of the liver and spleen was revealed, with more or less inflammation of the intestinal tract.

Bacteriology: Smears of the heart-blood revealed many short, thick rods, mostly single, evenly stained, with no spores. They were Gram-negative. Cultures of the heart-blood, spleen and intestinal tract, on blood-hormone agar, Russell's double-sugar medium and hormone broth plus calf brain pH 7.2, revealed an organism of similar morphological characteristics in pure culture. Further biological tests proved this organism to be the *Bacillus paratyphosus.*

Agglutination tests made with antigens of this organism and positive *Bacillus paratyphosus* A and B serum, and also *Bacillus pullorum* serum, revealed it to be the B type.

Bird inoculation: Two normal canary birds were inoculated with a culture of this organism, as follows:

Bird 1 was injected subcutaneously with 0.001 cc of a twenty-four-hour bouillon culture. This bird manifested typical symptoms of the infection within twenty-four hours and died within thirty-six hours.

In bird 2 an attempt was made to infect through the drinking-water. A 1-100 dilution of a twenty-four-hour bouillon culture in sterilized tap water was placed in the drinking-cup and removed immediately after the bird drank. The bird remained apparently normal for six days and was found dead on the seventh day.

From both of these birds the organism was isolated from the heart-blood in pure culture.

Passive immunization: Five birds showing slight symptoms of the infection were treated as follows:

Three of the five birds were injected intraperitoneally with 0.5 cc of anti-colon-paracolon-aerogenes-enteritidis serum (anti-white scours serum) and five hours later with 0.2 cc of the same serum.

The remaining two birds were injected intraperitoneally with the same doses of anti-paratyphoid B serum. The course of the disease was unaltered in either group, death occurring in every bird.

At the height of the infection it was suggested to the owner that the remaining birds be injected with a bacterin prepared from the micro-organism isolated, but he would not consent, accepting his losses, inasmuch as the birds were of a cheap variety.

Conclusions

1. An infection occurred among two hundred canary birds with a mortality of 74.5 per cent, which proved to be due to the *Bacillus paratyphosus* B.

2. Experimental infection of one bird occurred through the drinking water, demonstrating that the organism can withstand the germicidal properties of the gastric secretion, even though unprotected by food, mucous, etc.

REFERENCE

[1]Ward & Gallagher: Diseases of Domesticated Birds. (New York, The MacMillan Co., 1920).

A COMPOUND COMMINUTED FRACTURE OF THE RADIUS AND ULNA IN A HORSE

By Manuel M. Robles

College of Veterinary Science, University of the Philippines, Los Banos, Laguna, P. I.

I report this case of fracture as it is both unique (as all cases of fracture are) and interesting because its cause is unknown.

The animal, a one and one-half year old filly, was found one morning in a pasture presenting a picture, as shown by the accompanying photograph, on the medial aspect of the left forearm. The condition was about twelve hours old. Except for the refusal to eat, the animal showed no other general disturbance.

The case was condemned. Upon a detailed examination of the injury, the following were found: (1) median artery and satellite veins completely ruptured; (2) flexor carpi radialis partly ruptured; (2) extensor carpi radialis highly hemorrhagic, with proximal segment of the fractured bones embedded in the muscle; (4) common extensor muscle hemorrhagic; (5) subcutaneous tissue and fasciae around the injury edematous and hemorrhagic; (6) complete fracture of the radius and distal extremity of the ulna, several loose bony fragments, and cracks of the fractured ends of the bones.

The animal, with another horse and a bullock, was confined in a small corral which was thoroughly searched for deep holes or

objects which might entangle the forearm. There were none. Causes maliciously inflicted might be thought of but they appear to be very remote, considering the ownership and customs of the neighborhood.

FIG. 1. Compound comminuted fracture of the radius and ulna in a horse (x⅓).
1, radius; 2, cephalic vein; 3, flexor carpi ulnaris; 4, flexor carpi radialis (partly); 5, skin

It is to be further noted that, in spite of the complete rupture of the median artery and veins, hemorrhage was very slight.

REVIEW

MICROBE HUNTERS. Paul de Kruif, Ph.D. Harcourt, Brace & Co., New York, 1926.

The veterinarian has enough to make him mad in his practice. Now comes the writer with popular appeal and adds insult to injury. Dr. de Kruif, formerly of the University of Michigan, has written a most entertaining story, or series of stories, of the doings of the "microbe chasers." He is a master of sarcasm. He has drawn on his imagination effectively, but I think quite fairly, in an effort to paint a vivid picture for the common people, of the mighty efforts of these remarkable men of many lands, two of whom it is pleasing to note are Americans.

But why must he rub it in to the "horse doctor?" He seems to delight in it. A veterinarian may gain some satisfaction from the author's apparent equal delight in rubbing it in to everybody.

By one who undertakes to read the book (and if one starts, one will certainly not fail to finish) the impression may be gained that what we know as veterinary science in its best and truest sense, i. e., the "study of the diseases of the lower animals," is a most worthy and inspiring career. Out of the study of the diseases of the lower animals has come our present knowledge of what we call medicine—all medicine.

The book can not be criticised for inaccuracy, but the author may be chided for bias, levity and profanity. The book made me mad and madder, with alternate periods of hilarity and real inspiration. It can be recommended to everyone interested in disease. Nearly every reader will have presented to him an entirely new and refreshing picture of:

Leeuwenhoek, The First of the Microbe Hunters.
Spallanzani, Microbes Must Have Parents!
Pasteur, Microbes are a Menace!
Koch, The Death Fighter.
Pasteur, And the Mad Dog.
Roux and Behring, Massacre of the Guinea Pigs.
Metchnikoff, The Nice Phagocytes.
Theobald Smith, Ticks and Texas Fever.
Bruce, Trail of the Tsetse.
Ross vs. Grassi, Malaria.
Walter Reed, In the Interest of Science—And for Humanity!
Paul Ehrlich, The Magic Bullet.

W. G.

ABSTRACT

OM FREMSTILLING OG FORBRUG AF REKONVALESCENT-SERUM UNDER MUND-OG KLOVSYGE-EPIZOOTIEN IN 1924-25 (On the Production of and Demand for Convalescent Serum During the Epizootic of Foot-and-Mouth Disease in 1924-25). C. W. Andersen and H. O. Schmit-Jensen. Den Kgl. Veterinaer-og Landbohojskoles Aarsskrift, Copenhagen, 1925.

During this epizootic, a law was passed compelling owners of infected herds to permit the bleeding of their cattle for the purpose of obtaining large quantities of convalescent serum. The bleeding was done by an authorized representative from the serum laboratory of the Royal Veterinary and Agricultural College. The blood was brought to this laboratory, where it was centrifuged. The method of collecting the blood and the method of centrifugalization are described. Illustrations are given of the apparatus employed. The author does not mention the effects obtained through the use of this serum in Denmark. He states, however, that the use of this kind of serum has given good results in other countries.

H. J. S.

Yes—Suh! Lexington, Ky., Aug. 17-18-19-20, 1926

PUBLICATIONS RECEIVED

Veterinary Research Report, No. 1. (Science Bul. 24.) Department of Agriculture, New South Wales. April, 1925. H. R. Seddon et al. pp. 47.

Year Book Michigan State Veterinary Medical Association. Proceedings 43rd Annual Meeting, East Lansing, Mich., June 23-24-25, 1925. pp. 116.

The Scientific and Research Work of Parke, Davis & Company, Detroit, Mich. pp. 24. Illustrated.

Report of the Chief of the Bureau of Animal Industry, United States Department of Agriculture, year ended June 30, 1925. J. R. Mohler. pp. 40.

National Research Council, Organization and Members, 1925-1926. Washington, D. C., December, 1925. pp. 59.

Livestock Exhibits of the United States Department of Agriculture at the Twenty-Sixth International Live Stock Exposition, Chicago, Ill., November 28-December 5, 1925. pp. 61.

Third Report of the Government Institute for Veterinary Research, Fusan Chosen, Japan. December 25, 1925. Takizo Mochizuki. pp. 56 + 264, 26 figs.

Proceedings of the Twenty-Ninth Annual Meeting of the Uuited States Live Stock Sanitary Association, Chicago, Ill., December 2-4, 1925. pp. 264.

ARMY VETERINARY SERVICE

CHANGES RELATIVE TO VETERINARY OFFICERS

Regular Army

Captain William H. Dean is relieved from duty at Fort Riley, Kansas, effective between September 2 and 5, 1926, and will report to the Commanding Officer, The Cavalry School, Fort Riley, to pursue the troop officers' course.

Captain Will C. Griffin is relieved from duty at Ft. Douglas, Utah, and directed to report to the Commanding Officer, Fort Sam Houston, for duty not later than June 30, 1926.

Captain Daniel H. Mallan is relieved from duty as student at The Cavalry School, Fort Riley, Kan., on completion of the course on June 10, 1926, and directed to report to the Commanding Officer, Fort Benning, Ga., for duty.

Major George H. Koon is relieved from duty at the Medical Field Service School, Carlisle Barracks, Pa., and directed to report between August 20 and September 3, 1926, to the Commandant, Command and General Staff School, Ft. Leavenworth, Kan., as student officer for the 1926-1927 course.

Second Lieutenant Verne C. Hill is directed to report to the Commanding Officer, Fort Bliss, Texas, on completion of the course at the Medical Field Service School, Carlisle Barracks, Pa., on June 4, 1926, instead of Fort Myer, Va., as directed by previous orders.

Second Lieutenant Elmer W. Young is directed to report to the Commanding Officer, Fort Huachuca, Arizona, on completion of the course at the Medical Field Service School, Carlisle Barracks, Pa., on June 4, 1926, instead of the Presidio of Monterey, Calif,. as directed by previous orders.

Captain Gardiner B. Jones is relieved from duty at Fort Sam Houston, Texas, effective on or about September 1, 1926, and directed to report to the Commanding Officer, Fort McIntosh, Texas, for duty.

Captain Daniel S. Robertson is relieved from duty at Fort Bliss, Texas, and directed to report to the Commanding Officer, Fort Douglas, Utah, for duty not later than June 30, 1926.

Captain John R. Ludwigs was relieved from duty at Seattle Quartermaster Intermediate Depot, Seattle, Washington, as of April 17, 1926, and directed to report to the Commanding Officer, Camp Lewis, Wash., for duty, from temporary duty at same station.

The following veterinary officers are directed to report to the stations indicated on completion of course at the Medical Field Service School on June 4, 1926, instead of July 1, 1926, as directed in previous orders:

Captain Jesse D. Derrick, Camp Marfa, Texas.
Captain Patrick H. Hudgins, Fort Riley, Kansas.
Second Lieutenant Harry R. Leighton, Fort Sill, Oklahoma.

Reserve Corps

New Acceptances

Captain:
Gordon, Glenn Harold.....707 Maple Avenue, Plymouth, Mich.
Haigh, Henry Harrison.....17 Carroll St., Trenton, N. J.

First Lieutenant:
O'Brien, James Henry.....134 Howe Street, Marlboro, Mass.
Wilson, John Thomas.....611 Boulder, Pawnee, Okla.

Second Lieutenant:
Hicks, Jay Clyde.....R-2, Box 82, Tucson, Arizona.
Sanders, Charles Lee.....29 E. 6th Street, Dayton, Ohio.
Tenney, Norman Harrison.....White River Junction, Vermont.

Promotions

Second Lieutenant Fred Arthur Clarke, 880 Home Avenue, Oak Park, Ill., promoted to grade of First Lieutenant.

Second Lieutenant Anson Harris Hill, 127 Kansas City Street, Rapid City, S. D., promoted to grade of First Lieutenant.

Separations

First Lieutenant John M. Casey, Triunfo, Calif., failed to accept reappointment.

First Lieutenant Glenn Harold Gordon, 707 Maple Avenue, Plymouth, Mich. Appointment terminated together with commission as National Guard officer.

Captain Harry Preston Welsh, 1923 St. Clair Street, St. Paul, Minn. Discharge effective April 4, 1926.

In the Heart of the Blue Grass
August 17-18-19-20, 1926

COLONEL TURNER TO WASHINGTON

As announced in the May issue of the JOURNAL, Colonel W. Geo. Turner, who has been on duty at the Purchasing and Breeding Headquarters, Kansas City, Mo., for the past year, has been transferred to Washington, D. C., for duty in the Office of the Surgeon General, succeeding Lt. Col. J. A. McKinnon, as Director of the Veterinary Corps.

Colonel Turner joined the Army at Chicago, January 19, 1893, and was assigned to Fort Sheridan, Ill., as post veterinarian until April, 1898. A few days after war was declared with Spain, Colonel Turner was sent to Chickamauga Park, Ga. He remained there as veterinarian in charge of that camp for the period of the war.

During these years, Colonel Turner received frequent assignments to the old animal purchasing boards and, when the War Department opened its first office in 1908, from which practically all horses and mules were purchased for the service, he was designated by the War Department as Inspector of Animals, with headquarters at Kansas City, Mo.

Colonel Turner's next assignment was at the U. S. Military Academy, West Point, N. Y., and from there he was transferred to the Isthmus of Panama. It was about this time that the Veterinary Corps was attached to the Medical Department of the Army. Simultaneously the first Department Veterinarian of the Department of the Canal Zone came into being and a veterinary detachment was organized and put into operation. The next assignment of Colonel Turner was Camp Lee, Va., with its Veterinary Training Camp. He had command of the

5th Veterinary Replacement Unit, consisting of 210 men and 39 officers. This unit was scheduled to sail for France, October 5, 1918, but owing to unavoidable delays, due to influenza and other causes, the armistice was signed before the unit reached Hoboken. February, 1919, found Colonel Turner at Camp Dix, N. J., where he was a part of what was probably the greatest demobilization organization that this country ever had. With the most liberal authority from the Surgeon General, it was possible to keep pace with the speed of the other arms of the service and handle with the greatest dispatch the large number of veterinary officers who reported at Camp Dix upon their arrival from overseas.

In 1920 Colonel Turner was sent to the Army Veterinary School, at Chicago, and upon graduation was detailed to the Philippines as Department Veterinarian. After remaining there two years, which included a trip through China, Manchuria, Korea and Japan, with his wife, daughter and son, Colonel Turner returned to the Presidio of San Francisco, the headquarters of the 9th Corps Area, as Corps Veterinarian. From there, he went to the Central Remount Purchasing Headquarters, Kansas City, Mo., in July, 1924.

Colonel Turner, in addition to his demonstrated executive ability, is said to be one of the best judges of horses in the Army. His many friends in the profession will be glad to see Colonel Turner in this new position of honor and trust.

ON THE WAY TO LEXINGTON

Oat field near Owensboro in Ohio River bottoms. Illustrative of the best agricultural conditions of this important region.

THE ARMY VETERINARY SCHOOL

It will be interesting to take notice of the great advance made by the Veterinary School of the United States Army, since its organization in 1917. "At that time," says Lt. Col. William P. Hill, Vet. Corps, U. S. A., in concluding an article in the *Military Surgeon*, "it was a course of six weeks' duration and included meat inspection only. In 1920 administration and sanitation were added to this course. In 1922 the school was moved from Chicago to the Army Medical Center at Washington, and forage inspection, preventive medicine and clinical pathology, roentgenology, and veterinary surgery were added to its curriculum. The writer, who was a military observer abroad during the World War and had the opportunity to visit the military veterinary schools of many foreign armies, can unqualifiedly state that, in his opinion, the present Veterinary School of the United States Army is the most modern and up-to-date of any such school in the world.

"To continue further the progress of the Veterinary School a new building seems quite a necessity. A hospital and operating room should also be supplied, as we are at present entirely dependent upon the outside station of Fort Myer, Va., for this instruction. A refresher course for veterinary field officers would also be an advantage to the service."

—*Army and Navy Journal.*

EXAMINATION FOR VETERINARY CORPS

It is contemplated to hold examinations throughout the continental United States beginning July 12, 1926, for the purpose of qualifying candidates for appointment in the Veterinary Corps, Regular Army.

To be eligible to take the examination, the applicant must be a male citizen of the United States, between the ages of 21 and 29 9-12 years, and a graduate of a recognized veterinary college.

Application blanks, Form No. 62, A. G. O., may be obtained from The Adjutant General or The Surgeon General, Washington, D. C., or from the Commanding Officer or the Surgeon of any military post or station and, when completed, should be forwarded direct to The Adjutant General of the Army, Washington, D. C.

Veterinarians desiring to take the examination should obtain the necessary application blank and submit it at the earliest practicable date.

COMMUNICATIONS

FAVORABLY IMPRESSED

To the Editor:

I have been very favorably impressed with your editorial on "Mineral Mixtures Again," in the May issue, and commend your stand.

May I ask how or where I can obtain a copy of the report of the National Research Council on "Mineral Nutrient Requirements of Farm Animals," as mentioned in your article.

Any information you can give will be greatly appreciated.

L. F. Conti.

Glendale, Calif., May 11, 1926.

(The report referred to was published by the National Research Council, Reprint and Circular Series, No. 60, December, 1924, as a report of the Subcommittee on Animal Nutrition, of which Dr. E. B. Forbes is chairman. The entire report was reprinted in the *Cornell Veterinarian*, July, 1925. It was also reprinted in the University of Illinois *Animal Pathology Exchange*, September-October-November, 1925. An abstract of the report was published in the Journal, January, 1926, p. 526. Editor.)

WANTS MORE EDITORIALS

To the Editor:

I have just read your editorial in the May number entitled, "Mineral Mixtures Again." I want to congratulate you for having the "guts" to go after these fellows who are trying to commercialize the profession.

I have been fighting these mineral peddlers for years, and welcome such assistance as our scientific research men give us. The editorial referred to above sure expresses the sentiments of all honest practitioners.

I have always believed that the surest way of helping the profession was from the inside. If we keep ourselves clean and honest we have nothing to fear from the outside, as honest service will be appreciated by the live stock industry. Let your policy be one such editorial every month.

I am enclosing a letter from our mutual friend and co-worker, Dr. L. A. Merillat. While the letter covers the hog serum situation of a few years ago, the substance and logic of it is applicable to the mineral craze of the present day.

When things are not going as we would like, a careful reading of Dr. Merillat's letter is sure a good tonic to a man in private practice.

I am too modest to write this for publication. I merely wish to thank you in appreciation of the editorial.

J. L. McEwan.

Frankfort, Ill., May 15, 1926.

ANOTHER OPINION

To the Editor:

Your editorial in the May issue at hand today and read same while waiting for dinner. I want to compliment you on your statements of the facts. Personally, if the stockmen want to buy minerals, I will sell them, but as for pushing them and running around peddling them—nothing to it. In this part of the State the feed dealers are putting minerals in their feeds, so there does not seem to be any use in thinking anything about it. I have not had any demand for same, though plenty of chances to sell them.

Don A. Boardman.

Rome, N. Y., May 5, 1926.

(In discussing this subject, there are a few fundamentals on which practically all veterinarians agree, namely, that there are pathological conditions in animals, the result of mineral deficiency, of one kind or another; that the veterinarian is the only man properly trained to diagnose and treat these conditions, some of which are rather complex; that these conditions can usually be corrected, with appropriate treatment; that some of these conditions indicate the administration of mineral salts, along with other corrective measures not of a purely medicinal character; that the veterinarian is the only man who can intelligently prescribe the treatment needed; and that it is each veterinarian's privilege to select the manner in which he desires to have the remedy placed in the hands of his client—he can furnish it to his client direct or he can tell his client where to get it. Both methods are being used by perfectly reputable veterinarians. Editor.)

WE WOULD NOT BE SURPRISED

John Bowman of Lanark was here this afternoon. He tells us that he has been selling much of his hog cholera remedy and that it is giving the greatest of satisfaction, around Ideal and other places along the Whiteside County line, where it has been raging for the past six months. He says from one or two bottles is all any of them needed to cure the sick and keep the well ones well. If he doesn't look out they will be prefixing "Dr." to his name.

—Mt. Carroll, Ill., *Mirror-Democrat.*

COMMENCEMENTS

ONTARIO VETERINARY COLLEGE

The spring examinations of the Ontario Veterinary College, Guelph, Ontario, were completed on April 29, and graduation exercises were held the following day.

The degree of Bachelor of Veterinary Science was conferred at a special Convocation of the University of Toronto on twelve graduates as follows: Howard E. Burdick, Raymond G. Chapman, George C. Cilley, Frank J. Cote, James Gillies, Cecil M. Hamilton, Milton I. Lowrie, Carl E. Reckin, H. Sumner Smith, Lionel Stevenson, Paul C. Underwood, and Robert V. L. Walker.

Honors were awarded to members of the graduating class, as follows:

General Proficiency

First Prize—Frank J. Cote, of Guelph, Ont.
R. V. L. Walker, of Ingersoll, Ont.

Second Prize—H. Sumner Smith, of McKeesport, Pa.

Third Prize—H. E. Burdick, of Ashaway, R. I.

Honorable mention—L. Stevenson, of Guelph, Ont.; J. Gillies, of Cedarville, Ont.; C. E. Reckin, of Wiarton, Ont.; M. I. Lowrie, of Toronto, Ont.; P. C. Underwood, of Fort Scott, Kans.; C. M. Hamilton, of Portage La Prairie, Man.; G. C. Cilley, of Concord, N. H.; R. G. Chapman, of Toronto, Ont.

Bacteriology

R. V. L. Walker, of Ingersoll, Ont.

Canadian Army Veterinary Corps Honorarium

C. M. Hamilton, of Portage La Prairie, Man.

K. S. A. C. VETERINARY PRIZES

The names of the winners of the veterinary prizes at the Kansas State Agricultural College were announced at the annual banquet of the K. S. A. C. Veterinary Medical Society, held in the Gillett Hotel, Manhattan, Thursday evening, April 22, 1926. The actual bestowal of the prizes took place in the College Auditorium, on May 7, so-called Recognition Day. At this time, all winners of student prizes in the College received their prizes and awards. In addition to the cash awards, each prize winner received an appropriately worded, engraved certificate of merit. The awards follow:

General Proficiency

The Schmoker First Prize of $10.00—Wayne Santee O'Neal, of Tarkio, Mo.
The Schmoker Second Prize of $5.00—Philip Ray Carter, of Bradford, Kans.

Therapeutics

Jensen-Salsbery First Prize of $10.00—Ellmore Franklin Sanders, of Erie, Kans.

Jensen-Salsbery Second Prize of $5.00—Earl Francis Graves, of Manhattan, Kans.

Pathology

Faculty Prize of $7.50—Wayne Santee O'Neal, of Tarkio, Mo.

Physiology

Faculty Prize of $7.50—Roy Lewis McConnell, Manhattan, Kans.

The money for these prizes was made available through the generosity of Dr. E. A. Schmoker (K. S. A. C. '17), of Monroe, Wash.; the Jensen-Salsbery Laboratories, of Kansas City, and the veterinary faculty of the College.

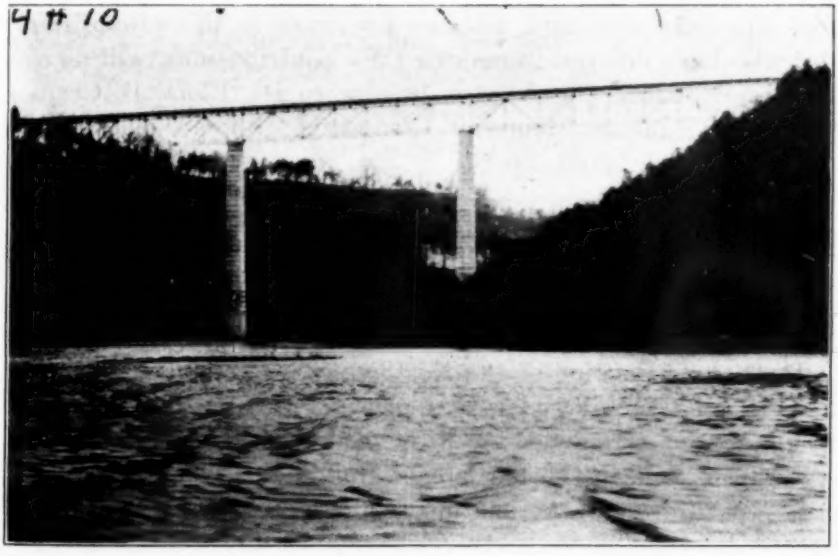
CULTURED, TO SAY THE LEAST

An Iowa man has been visiting near Boston and gives this description of the cultured manners of Bay State swine:

"Grunting in hog Latin, the well-groomed herd took their places along the old rail fence. . . . During the entire meal I saw only one lapse of etiquette. Dinner over, the group withdrew to a spreading chestnut tree and spent the evenings in a delightful family visit, while the moon rose over the peaceful hills and bathed the landscape in silver radiance."

—*The Kansas Farmer.*

ON THE WAY TO LEXINGTON



Kennedy Bridge, 255 feet above stream bed of Dix River Dam Lake.

MISCELLANEOUS

FOREIGN PARASITOLOGISTS EXPRESSING INTEREST IN PROPOSED RANSOM MEMORIAL

A progress report on the B. H. Ransom memorial fund shows the interest that is being expressed in the proposition, not only by Dr. Ransom's fellow countrymen but by parasitologists in numerous foreign countries where he was held in high regard. The fund has now reached the sum of $622; of this amount $121 has come from foreign countries. The latest contributions to be received from abroad are from the small country of Roumania, and include donations from a prominent parasitologist of Bucarest, the Ministry of Agriculture and the members of the Laboratory of Parasitology of the Faculty of Veterinary Medicine. A Japanese parasitologist has pledged $25 to the fund, while others in Germany, France, Denmark, China, India and Canada have sent $10 or more in each case. Other countries represented are England, Switzerland, Belgium, Sweden and Italy, making a total of thirteen foreign countries.

A large majority of both foreign and American subscribers have voted that the memorial take the form of a money prize or a scholarship in parasitology. Since the fund is still inadequate for either of these purposes, the committee has decided to postpone making a definite choice until a later date and it is hoped that American scientists, who are interested in this proposition and who have delayed in making their contributions, will do so at an early date. Checks may be sent to Dr. Eloise B. Cram, Secretary, Ransom Memorial Committee, Bureau of Animal Industry, Washington, D. C.

Lexington! Let's Go!

NORTHWESTERN VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Northwestern Veterinary Medical Association will take place, August 2-3-4, 1926, at Victoria, B. C. By the courtesy of the Provincial Government, the meetings will be held in the Parliament Buildings. The Hon. E. D. Barrow, Minister of Agriculture, will welcome the Association on behalf of the government. The Association is fortunate in

that Dr. W. Graham Gillam, Honorary General Secretary, has persuaded Dr. E. A. Watson, Chief Pathologist for the Dominion Government, to come west to give the members an address. American visitors can rest assured that they will receive a very warm welcome from the British Columbia members, and it is to be hoped that they will bring the ladies along with them.

A banquet is being arranged for the evening of August 3, to be staged at the Dominion Hotel, which will be the headquarters of the Association during its session. It is hoped to have an auto excursion on the afternoon of the third day, which will consist of a trip around the Saanich Peninsula. The scenery on this trip is very beautiful. Several points of interest will be visited, including the Government Observatory, the Experiment Farm and the famous Butchart Gardens. For those bringing their cars and desiring to camp, there are several auto camps within easy access of the city. Washington members can obtain further information from their Secretary, Dr. J. W. Kalkus, Puyallup, and Oregon members from Dr. B. T. Simms, Corvallis. British Columbia members can apply to the Secretary of the British Columbia Association, Dr. W. Graham Gillam, Cloverdale, for information.

Yes—Suh! Lexington, Ky., Aug. 17-18-19-20, 1926

TWO NEW STATE VETERINARIANS

Dr. H. C. Givens, dairy and food inspector of Roanoke for the past six years, has been appointed state veterinarian of Virginia by the State Board of Agriculture. Dr. Givens will assume his new duties July 1, succeeding Dr. J. G. Ferneyhough, who has held the position of state veterinarian for twenty-three years. Dr. Givens is a native of Virginia, attended the Polytechnic Institute and obtained his veterinary degree from the United States College of Veterinary Surgeons, Washington, D. C., from which institution he was graduated in 1913. For the two years following, he engaged in private practice in Craig County and the city of Roanoke. He then entered the service of the U. S. Bureau of Animal Industry and was engaged in hog cholera eradication and tuberculosis control. Some of the time he was detailed to foot-and-mouth disease eradication. Dr. Givens resigned his position with the Bureau to accept the position of city veterinarian in charge of food inspection in the Health Department of the City of Roanoke. Dr. Givens is a

member of the A. V. M. A. and the Virginia State Veterinary Medical Association.

Dr. D. E. Westmoreland, of Owensboro, Kentucky, will assume the duties of state veterinarian of Kentucky, July 1, 1926, succeeding Dr. W. H. Simmons, who has tendered his resignation to take effect the same date. Dr. Westmoreland is a graduate of the Indiana Veterinary College, class of 1904, and has been prominent in veterinary circles in the Blue Grass State for some time. He is a member of the A. V. M. A., has served as resident secretary for Kentucky for the A. V. M. A., and is chairman of the Reception Committee for the Lexington meeting.

TATTOO MARKS IDENTIFY HOGS

A simple method for placing tattoo marks on hogs, so that they may be readily identified after slaughter, has been devised by Dr. F. E. Murray, of the U. S. Bureau of Animal Industry. The principal need for such identification is for detecting the origin of any diseased hogs found at the slaughtering places and to trace the channels through which infection spreads.

A description of the instrument, methods of using it, and various practical uses for such identification marks, are described in Miscellaneous Circular No. 57, just issued by the U. S. Department of Agriculture.

The form of the instrument considered most suitable for tattooing hogs consists essentially of a metal holder, about 18 inches long, slotted to receive five blocks of Babbitt metal, in which phonograph needles are embedded, with the points protruding about a quarter of an inch. The needles are arranged to form numbers and letters.

Ordinary black automobile enamel is used as a tattooing pigment. It is applied to the needle points with a brush. The mark is applied by merely striking the hog smartly with the instrument, usually on the fore part of the back. Tattooing causes no injury to the meat or inconvenience to the hogs.

A tattoo mark, properly applied, resists all attempts to remove it and, after death, is as permanent as the skin itself. It is a definite means of preserving the identity of hogs between farm and market. Extensive tests have demonstrated the practicability of the device in tracing the origin of animal diseases and in identifying the ownership of diseased animals in mixed shipments. Numerous other practical uses suggest themselves, such as tracing the source of animal parasites, experimental work

involving the study of dressed carcasses and identifying ownership in cooperative marketing.

A copy of the circular may be secured as long as the supply lasts by writing to the Department of Agriculture, Washington.

DR. MEYER VISITS ALOHA LAND

Karl Meyer went a'roving, across the ocean blue,
To far away Aloha-land, a horse disease to view;
He came to Honolulu at the closing of the day
And said to those who met him, "Gosh! I wish that I could stay."
He tripped adown the gang-plank, as music loudly played,
Saw quite a bunch of "vets" there, in garment weird arrayed.
Then, as he stood upon the dock with leis around his neck,
He said, "I'm glad to meet you, folks. I really am, by heck!
I've come along to size you up, you sure look good to me,
I'd heard you were a splendid bunch—and so I came to see;
I'm glad to be in Paradise, these Islands of the Blest."
And then he whispered to his wife, "I'm glad that's off my chest.
I think we'll have the grandest time—it's like a bit of Heaven;
I'm half convinced already we'll be back in '27
To hold our big convention. There'll be lots to see and do
And in this Pacific Crossroads there are problems not a few
For veterinarians to solve. We need to closer knit
The bonds of friendly intercourse with all these folks who sit
Out here, so far away from us, these loyal hearts and true
Who hold our Country's flag on high above the ocean blue."

I wonder if that's what you thought; friend Karl, I hope you did;
You're here among a host of friends; you came as you were bid.
We want you here, to size us up; we want to know you well,
And everything you want to know we're mighty glad to tell.
We want you to enjoy yourself and turn us inside out
And give us lots of good advice; we want to learn about
The A. V. M. A. convention; just tell us what to do
To get it here; you know, friend Karl, we're leaning hard on you;
We're going to do our utmost and nineteen twenty-seven
We hope we'll see you all convene in our Pacific Heaven.
So in our island fashion, in friendship, warm, sincere,
We offer you "Aloha," Karl, you're surely welcome here.

P. H. B.

(Among other things, Dr. P. H. Browning is no mean poet, as the above will demonstrate. His chief hobby is keeping the territory of Hawaii 100 per cent in the A. V. M. A. He is highly desirous of getting the A. V. M. A. to meet in Honolulu in 1927 and he is evidently counting heavily on Dr. Meyer lending his support to the "Crossroads of the Pacific," when the question is put to a vote.—Editor.)

ASSOCIATION MEETINGS

NORTHWESTERN OHIO VETERINARY MEDICAL ASSOCIATION

The eighteenth annual meeting of the Northwestern Ohio Veterinary Medical Association was held in the Chamber of Commerce, Toledo, Ohio, February 12, 1926. The attendance was approximately one hundred.

Dr. O. V. Brumley, of the Ohio State University, announced the completion of plans for the first annual veterinary conference to be held at the College of Veterinary Medicine, O. S. U., March 24-25-26.

Dr. Carl W. Gay, of the Ohio State University, was scheduled to present the subject of "The Sheep Industry in Ohio," but was unable to be present. However, the same subject was ably presented by Professor John W. Wouchet, sheep extension specialist of the University. He directed attention to the fact that Ohio was one of the leading sheep states of the Union, with 2,178,000 sheep, according to most recent figures. The value of Ohio's sheep industry was placed at $19,000,000, of this amount $13,000,000 being credited to wool. The loss from disease was stated to be in the neighborhood of 37 per thousand. Professor Wouchet illustrated his address with lantern slides, showing the different types and breeds of sheep found in Ohio. After he had finished his address, Professor Wouchet was given time to answer numerous questions asked him by the veterinarians present.

Dr. F. A. Zimmer, state veterinarian of Ohio, next addressed the meeting. His subject was "Diseases of Sheep from a Live Stock Sanitary Point of View." Dr. Zimmer enumerated the several infectious and contagious diseases of sheep encountered in Ohio and dwelt upon the most important features in connection with rabies, scabies and the different forms of necrobacillosis. Dr. Zimmer even reviewed the symptoms evidenced by sheep suffering from foot-and-mouth disease, although there has been none of this infection in Ohio for over ten years. Dr. Zimmer took the occasion to refresh the memories of the veterinarians present relative to their obligations in connection with certain rules and regulations of the Division of Animal Industry, in connection with some of these diseases.

The main attraction of the program was Dr. E. M. Nighbert, of the Zoological Division, United States Bureau of Animal Industry. Dr. Nighbert came all the way from Queen City, Mo., where he is directing experiments in connection with the control of sheep diseases for the United States Department of Agriculture. The Local Committee on Arrangements had provided a number of live sheep and Dr. Nighbert made good use of these in connection with his address. He demonstrated the proper method of drenching sheep for the treatment of stomach worms and also demonstrated the technic of examining the feces for the presence of parasitic ova. Following his talk, an opportunity was given Dr. Nighbert to answer a large number of questions put to him by members of the audience.

Dr. H. Preston Hoskins, secretary-editor of the American Veterinary Medical Association, had been invited by Secretary Lambert to be present and give all information available concerning the Lexington meeting. Dr. Hoskins not only did this, but took the opportunity to acquaint those present with certain other important activities of the national organization, particularly as they pertained to veterinarians of Ohio. Several of the veterinarians present had shown a desire to know more about the policy adopted by the A. V. M. A. and what was being done by the Committee on Policy. Dr. Hoskins outlined what had already been done by the Committee and briefly reviewed some of the problems which the Committee proposes to attack. He also outlined the purpose of the conference to be held in Lexington, the evening before the opening session of the convention, to which the State Association had been asked to send a representative. Dr. Hoskins urged a large attendance from Ohio this year, with the meeting so close-by.

The election of officers resulted in the selection of the following: President, F. A. Zimmer, Columbus; vice-president, J. H. Lenfestey, Lyons; secretary-treasurer, F. A. Lambert, Columbus.

The very cordial invitation of Dr. P. T. Engard, for the Association to hold the summer meeting in Marysville, was unanimously accepted.

In the Heart of the Blue Grass
August 17-18-19-20, 1926

ASSOCIATION OF DRUG AND FOOD OFFICIALS OF THE SOUTHEASTERN STATES

The ninth annual convention of the Association of Drug and Food Officials of the Southeastern States convened in Valdosta, Ga., March 17-18-19, 1926. Dr. Peter F. Bahnsen, state veterinarian of Georgia, presided. Valdosta is said to be the smallest city ever honored with a meeting of the Association. Valdosta was awarded the 1926 meeting largely as a result of the efforts of Dr. E. D. King, Jr., city meat and milk inspector of Valdosta, who extended the invitation at the 1925 meeting in Winston-Salem, N. C.

In his address of welcome on behalf of the city of Valdosta, Mayor W. D. Peebles incidentally remarked that, if people were to be judged by the company they keep, the visitors were all right, for they seemed to know that Dr. King could see bacteria as far as Dr. Bahnsen could hear a tick tick. Mayor Peebles also paid Dr. Bahnsen a very nice tribute for his efforts in promoting the sanitary program of his Department.

Quite a large number of veterinarians engaged in municipal meat and milk inspection were among those present. A number of these contributed to the program. Dr. E. D. King, Jr., presented a paper, "Are Municipal Owned and Operated Abattoirs Practical?" Dr. A. L. Hirleman, of the United States Bureau of Animal Industry, Atlanta, Ga., presented a paper, "The Principal Causes of Condemnation of Meats." (To be published in the JOURNAL.)

Recognizing the value of public education in regard to health work, the Association decided to establish a permanent Committee on Publicity. It will be the function of this Committee to obtain, through the daily press and in other ways, as much publicity as possible relative to public health work. The Committee will collect and prepare information relative to pure food work particularly. Dr. E. D. King, Jr., was named chairman of this Committee.

Yes—Suh! Lexington, Ky., Aug. 17-18-19-20, 1926

OHIO VETERINARY CONFERENCE

The first veterinary conference in Ohio was held at the College of Veterinary Medicine, Ohio State University, Columbus, March 24-26, 1926. There were 223 veterinarians registered from Ohio

and adjacent states, and all were greatly pleased with the excellent course presented by members of the faculty of the University, assisted by such eminent authorities as Dr. John W. Adams, president of the A. V. M. A., Dr. H. J. Milks, of the New York State Veterinary College, Dr. L. Van Es, of the University of Nebraska, and Dr. M. Dorset, of the U. S. Bureau of Animal Industry.

The following subjects were on the purely scientific program:

"Anatomy of the Fowl" (illustrated), by Drs. James D. Grossman and D. W. Asheraft.
"Avian Tuberculosis and Its Bearing on the General Tuberculosis Problem," by Dr. L. Van Es.
"Culling of Poultry," by Prof. E. L. Dakan.
"Parasites of Poultry," by Dr. Russell E. Rebrassier.
"Postmortems upon Poultry," by Dr. R. A. Hendershott.
"The Prevention of Rabies," by Dr. James McI. Phillips.
"Digestive Disorders of Dogs," by Dr. Howard J. Milks.
"Surgical Procedures upon Small Animals," by Dr. J. H. Snook.
"A Study of the Immunization of Sucking Pigs Against Hog Cholera," by Dr. M. Dorset.
"Balanced Rations," by Dr. Carl W. Gay.
"Nutritional Diseases," by Prof. John F. Lyman.
"Technic of the Agglutination Test for White Diarrhea," by Dr. Russell E. Rebrassier.
"Caponizing," by Dr. Walter R. Hobbs.
"Surgical Diseases," by Dr. John W. Adams.

Thursday afternoon was devoted to a symposium on the organs of reproduction. The anatomy of these organs was covered by Dr. James D. Grossman, the physiology by Prof. Roy G. Hoskins, the pathology by Dr. L. W. Goss, and diseases by Dr. J. N. Shoemaker.

Progressive veterinarians realize that veterinary practice is changing rapidly, and if they want to keep abreast of the times it is essential that they take advantage of such opportunities to get the latest and best that science and practice has to offer. The Ohio State University plans to have such a conference annually and to make it a progressive, practical course to meet the demands of modern veterinary practice.

Ohio is to be congratulated on the friendly spirit of cooperation that exists between the profession and the veterinary faculty of the Ohio State University, that contributes much to the professional welfare and progress in this good old state.

N. S. MAYO.

Lexington! Let's Go!

INTER-STATE VETERINARY MEDICAL ASSOCIATION

The first 1926 meeting of the Inter-State Veterinary Medical Association was held in the Chamber of Commerce club rooms, Sioux City, Iowa, March 25.

Dr. E. D. Sadler, of Wagner, S. D., who was elected president at the meeting in October, opened the meeting with an address, in which he emphasized the service the live stock owner has a right to expect of the veterinarian.

Dr. F. A. Laird, state veterinarian of Illinois, discussed "Plans for Controlling Bacillary White Diarrhea and Avian Tuberculosis." The plans seem to have been well prepared, and the results have been for the most part very encouraging.

Dr. Robert Graham, of the University of Illinois, followed Dr. Laird on the program with "Studies in Bacillary White Diarrhea and Avian Tuberculosis," using lantern slides to illustrate his experiments with these diseases. His experiments with pullorin in the eradication of bacillary white diarrhea were especially interesting. From the results of these early experiments it would look as though another valuable diagnostic agent will soon be available to the practitioner, and another forward step taken in preventive medicine. The apparent "team work" of Drs. Laird and Graham, cooperating with the practicing veterinarian, deserves applause and we believe it will bring results to the poultry raisers and live stock owners, as well as credit to the profession.

Dr. C. H. Covault, of Iowa State College, who was to have discussed "Diseases of Dairy Cattle," was unable to attend the meeting and Dr. H. E. Bemis took his part on the program. Dr. Bemis confined his remarks to "Sterility of the Cow" and demonstrated with specimens of uteri the different changes in these organs causing sterility. He presented the subject in a very interesting manner.

Dr. H. A. Simons reported a case of sweet clover disease, which proved to be an interesting topic for discussion.

Dr. Peter Malcolm, state veterinarian of Iowa, and Dr. E. R. Steel, secretary of the Iowa Association, were visitors at the meeting. Both of them were called upon for talks, and each responded with something of interest to the Association. Dr. Malcolm called attention to the probability of a shortage of veterinarians in the near future. Dr. Steel told of changes in the constitution and by-laws of the State Association, especially as these changes pertain to advertising.

The meeting closed with a dinner, dance and musical program, provided through the courtesy of the Sioux City and Sioux Falls Serum companies. Dr. F. W. Cairy presided as toastmaster.

P. L. Ellis, *Secretary.*

Yes—Suh! Lexington, Ky., Aug. 17-18-19-20, 1926

NORTHEASTERN PENNSYLVANIA VETERINARY MEDICAL CLUB

The Northeastern Pennsylvania Veterinary Medical Club, composed of veterinarians of this part of the State, met at the Sterling Hotel, Wilkes-Barre, March 26, 1926. Professor L. A. Klein, dean of the University of Pennsylvania School of Veterinary Medicine, was present and gave a lecture on "The Influence of Drugs on the Udder of Cattle." Dr. Klein brought out many new points of interest in this connection and stressed the influence of various food-products on the inflammatory conditions found in this organ. The importance of mastitis in cattle cannot be overestimated, because it attacks that part of the animal which produces milk for human consumption, any impairment of which reduces the profits of the farmer.

Dr. Klein's remarks were very timely and well received by the members present. At the close of his address, there was a general discussion of this lecture, which lasted for some time. This is one of a series of lectures which is being given by the University of Pennsylvania Veterinary Extension School for the veterinarians of this section, in conjunction with the state veterinarian and the Bureau of Animal Industry. The next lecture will be by Dr. C. J. Marshall, of the School of Veterinary Medicine, and will be given in Scranton.

Dr. H. R. Church, deputy state veterinarian, also was present and gave a very interesting and instructive talk on the State Dog Law. He also discussed the authority of the Pennsylvania Bureau of Animal Industry in the control of rabies, which was very appropriate at this time, on account of the prevalence of this disease in some sections of the State.

HAWAII VETERINARY MEDICAL ASSOCIATION

The third annual meeting of the Hawaii Veterinary Medical Association was held in the rooms of the Board of Agriculture

and Forestry, March 29, 1926, and the following routine business was transacted.

The report of the secretary and treasurer for the second annual meeting was read and approved. Dr. J. E. Bacus, from Molokai, was elected to membership. Dr. K. F. Meyer was unanimously elected an honorary member.

Officers elected for the ensuing year were: President, Dr. J. C. Fitzgerald, Paia, Maui; vice-president, Dr. L. E. Case, Honolulu, Oahu; secretary-treasurer, Dr. P. H. Browning, Honolulu, Oahu.

Upon motion, the meeting adjourned to attend the short course of lectures to be given by Dr. K. F. Meyer, Director, Hooper Research Foundation, San Francisco, Calif.

P. H. Browning, *Secretary.*

In the Heart of the Blue Grass
August 17-18-19-20, 1926

TERRITORY OF HAWAII VETERINARY SHORT COURSES

On account of the presence of an obscure disease somewhat resembling African horse sickness (pestis equorum) on the island of Maui, territory of Hawaii, the Board of Commissioners of Agriculture and Forestry sent for Dr. Karl F. Meyer, director of the Hooper Research Foundation, San Francisco, Calif., to investigate the disease. Dr. Meyer spent three years in South Africa with Sir Arnold Theiler, K. C. M. A., studying African horse sickness. While no definite diagnosis of the Hawaiian disease was made, Dr. Meyer was able to eliminate at once the possibility of pestis equorum. Further study will be made by Dr. Meyer, cooperating with Dr. B. A. Gallagher, bacteriologist of the Division of Animal Industry of the territory of Hawaii.

In conjunction with Dr. Meyer's investigation while in the Islands, he gave a series of lectures designated as a short course. These lectures were attended by all members of the veterinary profession in the Islands, as well as by many physicians and scientists as well as laymen. Many of the lectures were attended by upwards of 150 people.

The course of lectures follows:

March 25. "The Problem of Hypersensitiveness."
March 26. "Infectious Abortion and Human *B. Abortus* Infections."
"Hog Cholera and Filtrable Viruses."
"Local Immunity and Local Immunization."
"The Etiology of Scarlet Fever."

March 29. "A Review of Recent Work in Tuberculosis."
"Food Poisoning and Food Infections."
"Botulism."
March 30. "Rickettsia Infections in Man and Animals."
"Experimental Epidemiology."
"Milk Fever."
"Intestinal Flora Studies."
"Tetanus."

P. H. BROWNING,
Territorial Veterinarian.

Lexington! Let's Go!

SAGINAW VALLEY VETERINARY MEDICAL ASSOCIATION

The spring meeting of the Saginaw Valley Veterinary Medical Association was held in the Council Chamber of the City Hall, Flint, Mich., April 1, 1926. The following program was presented:

"Hemorrhagic Septicemia and Methods of Handling the Disease from the Standpoint of the Practitioner," Dr. W. E. McAndless, Capac.
"City Meat Inspection," Dr. C. C. Schafer, Flint.
"Problems of Small Animal Practice," Dr. W. E. Coomer, Bay City.
"Experiences with the Radical Operations for Fistulous Withers," Dr. Floyd Burlingame, Chesaning.
"Care and Treatment of Common Skin Diseases of Small Animals," Dr. E. K. Sales, East Lansing.

The program was concluded by a question-box in which all present participated.

B. J. KILLHAM, *Reporter.*

Yes—Suh! Lexington, Ky., Aug. 17-18-19-20, 1926

MAINE VETERINARY MEDICAL ASSOCIATION

The quarterly meeting of the Maine Veterinary Medical Association was called to order by President C. L. Ryan, of Dexter, at the Bangor House, Bangor, April 14, 1926, at 7:30 p. m.

Routine business was finished and Secretary Neal read a letter from Dr. H. W. Jakeman, of Boston, Mass., outlining the formation of a New England Veterinary Medical Association, that was tentatively agreed upon at Worcester, Mass., in Januray, 1926. Dr. F. L. Russell, of Orono, moved and a motion was carried to accept the invitation to join the New England Association.

A letter from Dr. H. Preston Hoskins, secretary of the A. V. M. A., was read, asking that a delegate, representing the Maine Association, be appointed to meet with the delegates from other states at Lexington, Ky., August 16, 1926. It was the opinion

of those present that such a delegate should attend, but the naming of the delegate was postponed until the July meeting.

Dr. J. B. Reidy was called upon for a talk on Texas fever and he responded by outlining the work accomplished by Drs. Theobald Smith and Kilborne, in 1889, when the discovery of the Texas fever tick, as the carrier of the cause of the disease, was made. This was the first discovery of an intermediate carrier of disease and a monument to veterinary science. Dr. Reidy stated that the far-reaching benefits to the human family, the live stock industry, the plant industry and the medical world, of this scientific discovery, bring home to us the importance of the graduate veterinarian, who must be depended upon to solve the various animal disease troubles of the future.

Dr. A. L. Murch, of Bangor, described an interseting case of what he diagnosed as septicemia hemorrhagica; five horses of a lot of twenty-five became sick, the first four at intervals of about two days and the fifth about thirty-six hours later, when Dr. Murch arrived. He found a doughy swelling in the brachial region and legs, enlargement and inflammation of the lymphatics in the region involved and labored breathing. The horse would lie down and get up only upon being forced, and had not passed any urine in twenty-four hours and, upon being drawn, it appeared as a thick, ropy, lemon-colored fluid. Respirations, 80; temperature, 106; pulse, 110; the animal died. The twenty remaining horses were treated with 5 cc of hemorrhagic septicemia aggressin and no other cases developed. It has been three weeks since this outbreak, which started about ten days after the working-period ended in the woods. There was no history in this case to show how infection got into the stable. Dr. A. J. Neal, of Bangor, had a similar case, in cattle, that he treated successfully with hemorrhagic septicemia vaccine. Dr. D. K. Eastman, of Bangor, stated that while in practice, in Vermont, several years ago, he had a similar case.

Dr. M. E. Maddocks, of Augusta, reported three separate cases of malignant edema that proved fatal—each one following an injury. Dr. Maddocks also reported a case of mastitis and gangrene, which he treated by incising the affected quarter, draining off and disinfecting the infected part, thus saving the cow. Dr. L. S. Cleaves, of Bar Harbor, and Dr. F. L. Russell, of Orono, suggested the amputation of a quarter in cases of gangrenous udder. Dr. A. L. Murch reported a case of mastitis where he had to amputate one-half of the udder, but saved the

life of the cow. Dr. C. L. Ryan stated that his experience with gangrenous udders had been that those he incised, and from which he drew off infected material, recovered, while those that he only syringed failed to recover. Dr. Murch reported that his experience with normal salt solution in azoturia was discouraging.

The next subject under general discussion was contagious abortion. Dr. A. L. Murch, who is an authority on this subject, stated that abortion was present in 75 per cent of the herds he had observed, and recommended vaccination with abortion vaccine as the best solution of the trouble. Dr. Russell stated that he thought the proper way to handle this disease was along the same lines as tuberculosis eradication, as now conducted, and said that the use of live germs in vaccination tended to spread the infection. Dr. D. K. Eastman stated that the attenuation of the germs used in the vaccine tended to lessen the danger of spreading infection. Dr. Murch stated that in the famous Ayredale herd of Bangor, where contagious abortion was found, veterinary experts from out of the State were called in and advised the slaughter method. This advice was not followed, but the herd was brought through with vaccination, and $48,000 worth of breeding stock had been sold from this herd since that time. Dr. M. E. Maddocks stated that contagious abortion differed from tuberculosis because many fully recovered from contagious abortion, whereas no cure was known for tuberculosis. He cited an interesting case where infection was traced to a well; infection was controlled after the well was closed. Dr. L. S. Cleaves reported a case of abortion that recovered without any treatment, not even disinfection. Dr. Neal reported an owner who thought feeding lime prevented abortion, and Dr. Russell the case of a farmer who thought he got good results from feeding sulphur in feed for garget.

Dr. Neal reported successful results in mastitis with mastitis bacterin and eight to ten drops of tincture of pokeroot. Dr. Maddocks stated that potassium iodid has proven satisfactory in some cases. He also stated that he had treated white scours in calves successfully by sanitation, at the State Hospital. Dr. Maddocks reported an interesting case he diagnosed as "forage poisoning." The animal acted as though drunk. The hay was changed and the animal recovered following the use of eliminants. Dr. Neal reported a similar case.

Dr. Ryan reported a case where the animal had just calved a few hours previously and was taken with a "crazy-like" fit and

slobbering. He treated the case for milk fever but the patient died. Dr. Neal reported an interesting case of pneumonia complications, following an attack of milk fever. He also reported a horse he is now treating, which puzzled him, as he could not get the heart back to normal. The pulse is intermittent, accelerated and weak in this case. Dr. C. F. Dwinal, of Bangor, stated that in "flu" cases such heart complications could be expected.

J. B. REIDY, *Res. Sec. for Maine.*

Lexington! Let's Go!

TEXAS VETERINARIANS TO MEET

Municipal milk and meat inspection and diseases and surgery of cattle will feature the program of the annual meeting of the State Veterinary Medical Association of Texas and the short course for graduate veterinarians to be held at the Texas A. & M. College, College Station, June 14 to 19, 1926, according to a preliminary announcement recently made by Dr. D. Pearce, secretary-treasurer of the Association. Dr. Pearce states that the Association is growing and getting stronger year by year and not through the efforts of any one man or group of men, but as a result of the fact that Texas veterinarians are realizing the importance of professional organizations for their individual well-being. The Ladies' Auxiliary of the Association is arranging a very fine program for the wives of the veterinarians in attendance.

Yes—Suh! Lexington, Ky., Aug. 17-18-19-20, 1926

BOOK ON FOX RANCHING

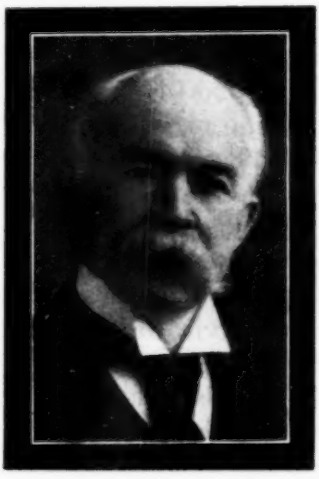
Judging from the appearance of specimen pages of "Theory and Practice of Fox Ranching," now on the press, there will soon be another book worthy of a place in the library of every veterinarian. The senior author of this book is Dr. J. A. Allen, whom many members of the A. V. M. A. met at the Des Moines meeting, in 1924. The junior author, Mr. W. Chester S. McLure, Member of Parliament for Prince Edward Island, has had sixteen years of experience as a practical fox farmer, fur expert and fox judge. The following significant statement appears in a letter concerning the book: ". . . . . today nearly all fox ranches of any importance are engaging veterinarians as ranch managers." The book will be reviewed in these columns in the near future.

NECROLOGY

RICHARD W. HICKMAN

Dr. Richard W. Hickman, formerly chief of the Quarantine Division, U. S. Bureau of Animal Industry, passed away at his home in Passaic, N. J., April 30, 1926.

Born in Cape May, N. J., in 1852, the son of a Methodist clergyman, Dr. Hickman attended the Philadelphia College of Pharmacy and was graduated with the degree of Ph. G., in 1871. He was employed as a clerk in a pharmacy at Holmesburg (Philadelphia) for several years. In 1874 he purchased a drug store in Trenton, N. J. Two years later he opened a pharmacy at Bustleton, a suburb of Philadelphia, where he continued in the drug business until the summer of 1888. In the meantime he



DR. RICHARD W. HICKMAN

had been reading medicine under the direction of a practicing physician. However, with the opening of the University of Pennsylvania School of Veterinary Medicine, he decided to take up the study of veterinary science rather than that of human medicine. He was graduated with the first class, in 1887, receiving the degree of V. M. D.

In 1888 Dr. Hickman accepted an appointment in the Bureau of Animal Industry of the U. S. Department of Agriculture and was assigned to the force, under Dr. W. S. Devoe, which had

been organized to combat contagious pleuropneumonia of cattle in the vicinity of Philadelphia. A few months later he was transferred to the force operating in the vicinity of New York and was conspicuous among those veterinarians who, under very unfavorable conditions, accomplished so successfully the first great task assigned to the new Bureau of Animal Industry, the eradication of contagious pleuropneumonia from the United States. In 1890 he was ordered to Chicago to inaugurate the inspection of cattle for export and later to take charge of the work of meat inspection in the great abattoirs of that city. In 1892 he was transferred back to New York and placed in charge of meat inspection there. In 1894 he was appointed to the chair of cattle pathology. in the New York College of Veterinary Surgeons and, on the amalgamation of the New York veterinary schools with the New York University, in 1899, was appointed Professor of Cattle Pathology and Meat Inspection and a member of the governing faculty, holding these appointments in addition to performing his official duties in the Bureau.

In 1900 he was transferred to Washington, D. C., and placed in charge of the administration of the national animal quarantine laws and regulations and became a recognized expert on quarantine and related matters. He held this position until his retirement, in 1922, after 34 years of continuous service. Hon. Henry Wallace, at that time Secretary of Agriculture, addressed a letter to Dr. Hickman expressing appreciation for and commendation of his long and faithful service in the Department, mentioning not only his able direction of the quarantine work of the Bureau of Animal Industry, but also the great service performed by him as a member of the committee appointed by the Department with a view to placing veterinary colleges of the United States on a higher plane of instruction and equipment.

Dr. Hickman joined the A. V. M. A. in 1890, at the meeting held in Chicago that year, really the first meeting held in the West. While stationed in Washington, he served the Association as Resident Secretary for the District of Columbia, 1912-13 and 1917-19. In 1920, largely due to Dr. Hickman's knowledge of pharmacy, he was selected as an alternate to represent the veterinary profession at the Decennial Convention of the Revision of the U. S. Pharmacopeia.

Though a pharmacist, accredited veterinarian and a specialist in veterinary education, Dr. Hickman was best known for his services in administering the federal quarantine, which has pro-

tected the live stock of the United States against destructive foreign plagues. Prior to 1922, he had drafted or revised most of the regulations relating to the export and import movement of live stock, and made important contributions to veterinary literature. He was a skilled pharmacist and always retained his interest in pharmacy, which he truly recognized as an important branch of materia medica having to do with a knowledge of drugs and their compounding.

Dr. Hickman was a man of exemplary character, possessed a charming personality, was of distinguished appearance and would have graced any profession. Those who were privileged to know him will retain pleasant memories of his uniform dignity, courtesy and affability, which won and held the general respect and friendship of all those associated with him, whether in church, society or business life. Upon his retirement from the Bureau of Animal Industry, in 1922, he moved with his wife from Washington, D. C., to Passaic, N. J., in order to be near his children and former friends, the latter city having been his home during the several years of his term of office in New York. His widow, with whom he celebrated the golden wedding anniversary in 1922, survives him, together with three sons, two daughters and seventeen grandchildren.

U. G. H.

OSCAR FOLLETT STEARNS

Dr. Oscar F. Stearns, of Cleveland, Ohio, died the week of March 23, of influenza. He was a graduate of the University of Pennsylvania, class of 1902, but had not been actively identified with the veterinary profession for some time.

DAVID MAX SAXE

Dr. David M. Saxe, of Atlantic City, N. J., died March 29, 1926, from complications resulting from an infected hand. He was a graduate of the University of Pennsylvania, class of 1911. He joined the A. V. M. A. in 1925 and was a member of the Veterinary Medical Association of New Jersey.

LOUIS A. MANSBACH

Dr. Louis A. Mansbach, of Philadelphia, Pa., died March 29, 1926, as the result of complications brought on by old age. Dr. Mansbach was a registered non-graduate practitioner of Phila-

delphia for many years (license 58) and had many friends in the profession who will regret to hear of this death. He was a member of the Pennsylvania State Veterinary Medical Association.

J. L. FARAGHER

Dr. J. L. Faragher, of Lorain, Ohio, died April 4, 1926, following a brief illness. He was 50 years of age. Dr. Faragher was born in Lorain, attended the public schools there, and received his veterinary training at the Ontario Veterinary College. He was graduated in 1901. In addition to his private practice, he held the position of City Food Inspector.

Dr. Faragher joined the A. V. M. A. in 1917. He was a member of the Ohio State Veterinary Medical Association. He was also a member of the Masonic, Elk and Eagle fraternities.

JOHN W. JAMESON

Dr. John W. Jameson, of Paris, Ky., died at his home, April 25, 1926, after a brief lllness. He had been in declining health for the past year, but had been able to attend to his practice until a few days before his death.

Born near Paris, August 3, 1845, Dr. Jameson spent his entire life in Bourbon County. He was graduated from the Ontario Veterinary College, in 1889, and enjoyed a large practice in the Blue Grass region.

Dr. Jameson joined the A. V. M. A. in 1897, and with his passing the number of remaining members, who joined the same year, was reduced to three. Dr. Jameson is survived by two daughters and one sister.

SIDNEY D. MYERS

Dr. Sidney D. Myers, of Wilmington, Ohio, committed suicide, May 3, 1926. His act was ascribed to despondency over ill health. He was 54 years of age.

A graduate of the Ontario Veterinary College, class of 1894, Dr. Myers spent practically all of his professional career in Wilmington, where he enjoyed one of the most lucrative practices in the State.

Dr. Myers joined the A. V. M. A. in 1905. He was a member of the Ohio State Veterinary Medical Association since 1896 and served the Association as president (1900-1902) and later as secretary (1908-1910).

MARRIAGE

Dr. W. G. Moore (Gr. Rap. '17), of Carlinville, Ill., to Miss Lydia M. Kuester, of Carlinville, March 16, 1926.

BIRTHS

To Dr. and Mrs. Thos. E. Cowgill, of Delaware, Ohio, a son, Roger, January 3, 1926.

To Dr. and Mrs. C. H. Haasjes, of Shelby, Mich., a son, Norris Edward, February 11, 1926.

To Dr. and Mrs. W. H. Haskell, of Beaumont, Texas, a son, William Harvey, Jr., March 10, 1926.

To Dr. and Mrs. J. R. Snyder, of Gordon, Nebr., a son, Roy Curtis, March 11, 1926.

To Dr. and Mrs. H. E. McDonald, of Hastings, Nebr., a son, Aldine Harold, March 20, 1926.

To Dr. and Mrs. Don A. Boardman, of Rome, N. Y., a son, Crager John, April 29, 1926.

PERSONALS

Dr. L. D. Brown (Chi. '97) is Mayor of Hamilton, Mo.

Dr. R. C. Griffith (Chi. '11) is president of the Fort Worth (Texas) Kennel Club.

Dr. Paul C. Kucher (K. C. V. C. '16) is City Food Inspector for Fort Wayne, Ind.

Dr. John W. Hermann (Cin. '13) gives his new address as 7 Hilldale Place, Hillside, N. J.

Dr. C. C. Harrold (Ind. '12) has resumed practice in Frankton, Ind., after an extended absence.

Dr. H. E. Kreidler (U. P. '21) has removed from Spartansburg, Pa., and is now at Red Hill, Pa.

Dr. Theo. Pfaff (Chi. '18), formerly of New Glarus, Wis., is now at Sun Prairie, Wis., Route 1.

Dr. A. T. Peters (Stutt.), of Peoria, Ill., has been elected president of the Rotary Club of Peoria.

Dr. R. S. Cooley (O. S. U. '19) is Assistant Health Commissioner of the city of Lakewood, Ohio.

Dr. E. Brainerd (McGill '93) has left Phoenix, Arizona, and is back at Colorado Springs, Colo.

Dr. H. F. Beardsley (Ind. '09), of Dale, Ind., recently returned from a six-months stay in Florida.

Dr. Hugh F. Dailey (U. P. '13) is Chief Veterinarian for the Angell Memorial Hospital, Boston, Mass.

Dr. R. N. Birdwhistell (Cin. '14), of Columbus, Ohio, is now located at Camp Chase, Ohio, R. F. D.

Dr. Charles E. Rice (Ind. '99), formerly of Ladoga and Rockville, Ind., has removed to Walkerton, Ind.

Dr. James A. Sluss (Ind. '21) has requested a change of address, from Hillsboro, N. C., to Jacksonville, N. C.

Dr. Charles V. Peace (U. P. '14) has served the city of Coatesville, Pa., as Health Officer for the past three years.

Dr. Paul Fischer (O. S. U. '92), formerly of Bartow, Florida, gives a new address: 306 Kenwith Court, Lakeland, Florida.

Dr. F. M. Hopper (Ind. '16), of Warsaw, Ind., is reported to have purchased a 570-acre farm in Martin County (Ind.) recently.

Dr. F. H. Wessels (Chi. '06), of Pontiac, Ill., has no misgivings about the future and has started the erection of a new hospital and office.

Dr. W. G. Moore (Gr. Rap. '17), of Carlinville, Ill., is erecting a new veterinary hospital, especially adapted to the needs of small animal practice.

Dr. G. Dikmans (Mich. '20), formerly connected with the Porto Rico Agricultural Experiment Station, is now at the Federal Experiment Station, Jeanerette, La.

Dr. F. E. McClelland (Corn. '09), of Buffalo, N. Y., addressed the senior veterinary class of Cornell University, March 24, 1926. His subject was "Jurisprudence."

Dr. A. J. DeFossett (O. S. U. '07), in charge of B. A. I. tuberculosis eradication work in Ohio, recently addressed the Exchange Club of Columbus Grove, Ohio, on the subject of bovine tuberculosis.

Dr. C. M. Carpenter (Corn '17), of the New York State Veterinary College, recently spent a week at the U. S. Hygienic Laboratory, in Washington, and worked with Dr. Evans along bacteriological lines.

Dr. F. E. Murray (O. S. U. '92), of Salt Lake City, Utah, formerly vice-president, Western Zone, of the National Association of B. A. I. Veterinarians, has been promoted to the office of Vice-President-at-Large.

Dr. J. J. Lintner (Chi. '08), in charge of B. A. I. tuberculosis eradication work in Illinois, was the principal speaker at the opening of the annual meeting of the Illinois Tuberculosis Association, at DeKalb, Ill., May 14-15.

Dr. C. D. McGilvray (McK. '01), principal of the Ontario Veterinary College, Guelph, Ont., paid a visit to Manitoba during the middle of April and called on many of his old acquaintances and friends in Winnipeg, where he lived for many years.

Dr. R. W. McCully (Ont. '90), of New York City, was the subject of an Associated Press dispatch recently, published in papers all over the United States. One of the headings given the article was as follows: "Veterinarian Goes All Over Nation to Save Famous Nags."